Draft Based on Core MoU Draft 5 – status: 09-Oct-2024 23:20

List of Annexes

--- COMMENT (Not part of the final Annexes) ---
Please note the following DRD1 specific elements regarding the attached Annexes:

- **Annexes Related to Work Packages (Annex 7)**
  Two versions of Work Package Annex 7.4.1 are included. The first version, located in the middle of the document, is the one we intend to use at the time of the MoU signature (without the WP-FAs and resource table). Institute participation is seen as expression of interest. The second version, at the end of the document, includes the WP-FAs and resource table and will be released once approval is granted by the Resource Coordination Board and Collaboration Board. The rules for approval are described in Annex 7.

- **Annex 1 – List of Institutes**
  The list of Institutes are extracted from https://cernbox.cern.ch/s/UwJ2KdDBrXNVz1b

Annex 1 Collaborating Institutions and their Contact Persons

ID	Country	Town	Collaborating Institution	Institution Code	Contact
1	Australia	Canberra	Australian National University	ANU	Lindsey Bignell
2	Australia	Melbourne	University of Melbourne	U Melbourne	Martin Sevior
3	Belgium	Ghent	Ghent University	UGent	Didar Dobur
4	Belgium	Louvain-la-Neuve	Université catholique de Louvain	UCLouvain	Andrea Giammanco
5	Belgium	Brussel	Université libre de Bruxelles	ULB	Gilles De Lentdecker
6	Belgium	Brussel	Vrije Universiteit Brussel	VUB	Michael Tytgat
7	Brazil	Rio de Janeiro	Centro Brasileiro de Pesquisas Físicas	Rio-CBPF	Gilvan Augusto Alves
8	Brazil	São Paulo	Instituto de Física da Universidade de São Paulo	IFUSP	Marco Bregant
9	Brazil	Rio de Janeiro	Universidade do Estado do Rio de Janeiro	UERJ	HeliovNogima
10	Bulgaria	Sofia	Institute for Nuclear Research and Nuclear Energy	INRNE	Plamen Stoianov Iaydjiev
11	Bulgaria	Sofia	Sofia University St. Kliment Ohridski	U Sofia	Leandar Litov
12	Canada	Ottawa	Carleton University, Ottawa	U Carleton	Jesse A. Heilman
13	China	Hong Kong	Chinese University of Hong Kong	CUHK	yanjun tu
14	China	Hong Kong	Hong Kong University	HKU	yanjun tu
15	China	Hong Kong	Hong Kong University of Science and Technology	HKUST	yanjun tu
16	China	Beijing	Institute of High Energy Physics, CAS	IHEP CAS	Huirong Qi
17	China	Lanzhou	Institute of Modern Physics, Chinese Academy of Sciences	IMP-CAS	Limin Duan
18	China	Changchun	Jiling University	U Jiling	Weimin Song
19	China	Tianjin	Nankay University, Tianjin	U Nankay	Chunxu Yu

20	China	Jinan	Shandong University		Zhu chengguang
21	China	Shanghai	Shanghai Jiao Tong University		Haijun Yang
22	China	Shenzhen	Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences	SIAT	Zheng Liu
23	China	Beijing	Tsinghua University	U Tsinghua	Yi Wang
24	China	Hefei	University of Science and Technology of China	USTC	Liu Jianbei
25	China	Wuhan	Wuhan University	U Wuhan	Zhenyu Zhang
26	Colombia	Medellín	Universidad de Antioquia, Medellin	U de Antioquia	Jose Ruiz Alvarez
27	Colombia	Bogota	Universidad de Los Andes, Bogota'	U de Los Andes	Carlos Andres Florez Bustos
28	Croatia	Zagreb	Ruder Boskovic Institute	RBI	Antonija Utrobicic
29	Czech Republic	Prague	Institute of Experimental and Applied Physics, CTU in Prague	CTU	Hugo Ferreira Natal Da Luz
30	Finland	Helsinki	Helsinki Institute of Physics	HIP	Francisco Garcia Fuentes
31	Finland	Jyväskylä	University of Jyväskylä	U Jyväskylä	Tuomas Grahn
32	France	Paris	École Polytechnique de Paris, Omega Group	CNRS-IN2P3/Omega	Christophe De La Taille
33	France	Caen	Grand Accélérateur National d'Ions Lourds	GANIL	Julien Pancin
34	France	Lyon	Institut de Physique des 2 Infinis de Lyon	IP2I	Imad Baptiste Laktineh
35	France	Gif-sur-Yvette	Institute of research into the fundamental laws of the Universe, CEA, Université Paris-Saclay	IRFU/CEA	Esther Ferrer Ribas
36	France	Clermont-Ferrand	Laboratoire de Physique de Clermont,	LPC-Clermont-Ferrand	Cristina Carloganu

37	France	Grenoble	Laboratoire de Physique Subatomique et Cosmologie (LPSC)-Grenoble	CNRS-IN2P3/UGA	Daniel Eduardo Santos
38	France	Rustrel	Laboratoire Souterrain à Bas Bruit Avignon Université	CNRS-LSBB	Ignacio Lazaro
39	France	Orsay	Université Paris-Saclay	CNRS-IN2P3/IJCLab	Gabriel Charles
40	Georgia	Tbilisi	Georgian Technical University, Tbilisi		Zviadi Tsamalaidze
41	Germany	Hamburg	Deutsches Elektronen-Synchrotron, Hamburg	DESY	Ties Behnke
42	Germany	Jülich	Forschungszentrum Jülich GmbH	FZJ-GSI-U Bochum	Peter Wintz
43	Germany	Bonn	Helmholtz-Institut für Strahlen- und Kernphysik, University of Bonn	HISKP Bonn	Bernhard Ketzer
44	Germany	Darmstadt	Helmholtzzentrum für Schwerioneforschung GSI GmbH	GSI	Bernd Voss
45	Germany	Hamburg	Institut of Experimental Physics, Hamburg University	U Hamburg	Konstantinos Nikolopoulos
46	Germany	Mainz	Johannes Gutenberg-University Mainz	JGU	Jakob Gulker
47	Germany	Wurzburg	Julius-Maximilians-University of Wurzburg	U Wurzburg	Raimund Stroehmer
48	Germany	Munich	Ludwig-Maximilians-University of Munich	LMU	Jonathan Bortfeldt
49	Germany	Munich	Max-Planck-Institute for Physics, Munich	MPP	Hubert Kroha
50	Germany	Heidelberg	Physikalisches Institut, Heidelberg University	U Heidelberg	Ingo-Martin Deppner
51	Germany	Bonn	Physikalisches Institut, University of Bonn	U Bonn	Klaus Desch
52	Germany	Aachen	RWTH Aachen University III. Physikalisches Institut	RWTH Aachen	Stefan Roth
53	Germany	Darmstadt	Technische Universität Darmstadt		Alexandre Obertelli

54	Germany	Munich	TUM School of Natural Sciences Technische Universität München	TUM	Laura Fabbietti
55	Greece	Thessaloniki	Aristotle University of Thessaloniki	AUTH	Dimitrios Sampsonidis
56	Greece	Athens	Institute of Nuclear and Particle Physics, National Center of Scientific Research Demokritos	NCSR Demokritos	Theodoros Geralis
57	Greece	Athens	National Technical University Of Athens	NTU Athens	Yorgos Tsipolitis
58	Hungary	Budapest	HUN-REN Wigner Research Centre for Physics		Dezso Varga
59	India	Kolkata	Bose Institute	Bose	Saikat Biswas
60	India	Guwahati	Indian Institute of Technology, Guwahati		Bipul Bhuyan
61	India	Kanpur	Indian Institute of Technology, Kanpur		Navaneeth Poonthottathil
62	India	Mandi	Indian Institute of Technology, Mandi		Amal Sarkar
63	India	Bhubaneswar	National Institute of Science Education and Research, Bhubaneswar	NISER Bhubaneswar	Shuddha Shankar Dasgupta
64	India	Chandigarh	Punjab University, Chandigarh		Vipin Bhatnagar
65	India	Kolkata	Saha Institute of Nuclear Physics	SINP Kolkata	Nayana Majumdar
66	India	Delhi	University of Delhi	U Delhi	Mohammad Naimuddin
67	India	Kolkata	Variable Energy Cyclotron Centre	VECC Kolkata	Anand Dubey
68	Israel	Beersheba	Ben Gurion University of the Negev	Ben-Gurion U	Lior Arazi
69	Israel	Jerusalem	Hebrew University of Jerusalem	HUJI	Guy Ron
70	Israel	Rehovot	Weizmann Institute of Science	WIS	Shikma Bressler
71	Italy	L'Aquila	Gran Sasso Science Institute	GSSI	Elisabetta Baracchini
72	Italy	Catania	INFN Laboratori Nazionali del Sud	INFN-LNS	Domenico Torresi

73	Italy	Frascati	INFN Laboratori Nazionali di Frascati	INFN-LNF	Davide Piccolo
74	Italy	Bari	INFN Sezione di Bari , University and Politecnico of Bari	INFN-BA	Alessandra Pastore
75	Italy	Bologna	INFN Sezione di Bologna	INFN-BO	Davide Boscherini
76	Italy	Ferrara	INFN Sezione di Ferrara	INFN-FE	Gianluigi Cibinetto
77	Italy	Lecce	INFN Sezione di Lecce , University of Salento	INFN-LE	Marco Panareo
78	Italy	Napoli	INFN Sezione di Napoli , University of Napoli	INFN-NA	Massimo Della Pietra
79	Italy	Padova	INFN Sezione di Padova	INFN-PD	Gianmaria Collazuol
80	Italy	Pavia	INFN Sezione di Pavia , University of Pavia	INFN-PV	Ilaria Vai
81	Italy	Pisa	INFN Sezione di Pisa	INFN-PI	Federico Pilo
82	Italy	Roma	INFN Sezione di Roma	INFN-RM1	Francesco Renga
83	Italy	Roma	INFN Sezione di Roma Tor Vergata , University of Roma Tor Vergata	INFN-RM2	Paolo Camarri
84	Italy	Roma	INFN Sezione di Roma Tre	INFN-RM3	Mauro Iodice
85	Italy	Torino	INFN Sezione di Torino, University of Torino	INFN-TO	Michela Greco
86	Italy	Trieste	INFN Sezione di Trieste	INFN-TS	Fulvio Tessarotto
87	Italy	Cosenza	Università della Calabria and INFN Gruppo Collegato di Cosenza		Marco Schioppa
88	Italy	Milano	University of Milano – Bicocca	UNIMIB	Gabriele Croci
89	Japan	Tsukuba	High Energy Accelerator Research Organization, Institute of Particle and Nuclear Studies	KEK-IPNS	Hajime Nishiguchi
90	Japan	Kobe	Kobe University	U Kobe	Ketaro Miuchi
91	Japan	Kyoto	Kyoto University	U Kyoto	Tomida Natsuki
92	Japan	Wakō	RIKEN	RIKEN	Tada Aki Isobe

93	Japan	Morioka	Iwate University (U Iwate)		Shinya Narita
94	Kazakhstan	Almaty	Institute of Nuclear Physics	INP-Almaty	Yerzhan Mukhamejanov
95	Lithuania	Kaunas	Kaunas University of Technology	KTU	Sigitas Tamulevičius
96	Poland	Krakow	AGH University of Science and Technology in Krakow	AGH-Krakow	Bartosz Mindur
97	Poland	Warsaw	AstroCeNT, Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences	AstroCeNT	Andre Cortez
98	Poland	Warsaw	Institute of Plasma Physics and Laser Microfusion	IPPLM	Maryna Chernyshova
99	Poland	Krakow	Jagiellonian University, Faculty of Physics, Astronomy and Applied Computer Science	JU-Krakow	Jerzy Smyrski
100	Portugal	Coimbra	Coimbra University (Faculty of Sciences and Technology)	U Coimbra	Joaquim Marques Ferreira Dos Santos
101	Portugal	Coimbra	Laboratório de Instrumentação e Física Experimental de Partículas	LIP-Coimbra	Alberto Blanco Castro,
102	Portugal	Aveiro	University of Aveiro	U Aveiro	Joao Veloso
103	Romania	Măgurele	Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering	IFIN-HH	Sorin Martoiu
104	Romania	Bucharest	National University of Science and Technology Politehnica Bucharest	UNSTPB	Bira Calin
105	Romania	Brașov	Transilvania University of Brasov		Radu Mihai Coliban
106	Serbia	Belgrade	Institute of General and Physical Chemistry		Dubravka Milovanovic
107	South Africa	Johannesburg	University of Johannesburg	U Johannesburg	Simon Henry Connell

108	South Korea	Daegu	Daegu Gyeongbuk Institute of Science and Technology	DGIST	Gain Kim
109	South Korea	Gangneung	Gangneung-Wonju National University	GWNU	Yong Wook Baek
110	South Korea	Seoul	Hanyang University	HYU	Tae Jeong Kim
111	South Korea	Seoul	Seoul National University	SNU	Do Won Kim
112	South Korea	Seoul	University of Seoul		Jason Lee
113	South Korea	Seoul	Yonsei Cancer Center		Dong Wook KIM
114	Spain	Zaragoza	Centro de Astropartículas y Física de Altas Energías / Universidad de Zaragoza	U Zaragoza	Theopisti Dafni
115	Spain	Madrid	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas	CIEMAT	Maria Fouz Iglesias
116	Spain	San Sebastián	Donostia International Physics Center	DIPC	Francesc Monrabal
117	Spain	Barcelona	Institut de Fisica d'Altes Energies	IFAE	Thorsten Lux
118	Spain	València	Instituto de Física Corpuscular, CSIC & Universitat de València	IFIC	Justo Martin-Albo
119	Spain	Santiago de Compostela	Instituto Galego de Física de Altas Enerxías / Universidade de Santiago de Compostela	USC/IGFAE	Diego Gonzalez Diaz
120	Spain	Oviedo	Universidad de Oviedo	U Oviedo	Barbara Alvarez Gonzalez
121	Spain	Vigo	Universidad de Vigo		Joaquin Collazo
122	Spain	Valencia	Universidad Politécnica de Valencia		Jose F. Toledo Alarcon
123	Sweden	Lund	Department of Physics, University of Lund	U Lund	Leif Jonsson
124	Sweden	Lund	European Spallation Source ERIC	ESS	Jerome Samarati

125	Switzerland	Geneva	European Organization for Nuclear Research	CERN	Eraldo Oliveri
126	Switzerland	Villigen	Paul Scherrer Institut	PSI	Malte Hildebrandt
127	Switzerland	Geneva	Université de Genève	U Genève	Federico Sanchez Nieto
128	Taiwan	Taipei	Academia Sinica		Wen-Chen Chang
129	Taiwan	Taoyuan City	National Central University		Po-Ju Lin
130	Turkiye	Bolu	Bolu Abant I˙zzet Baysal University	U Bolu-Abant	Yalcin Kalkan
131	Turkiye	Bursa	Bursa Uludag University	U Bursa	Ozkan Sahin
132	Turkiye	Istanbul	Istinye Üniversitesi	Istinye U	Serkant Cetin
133	UK	Coventry	Department of Physics, University of Warwick	U Warwick	Xianguo Lu
134	UK	London	Imperial College		Patrick Dunne
135	UK	London	Royal Holloway, University of London		Asher Kaboth
136	UK	Chilton	STFC Rutherford Appleton Laboratory	STFC-RAL	Pawel Majewski
137	UK	Cambridge	University of Cambridge / Cavendish Laboratory	U Cambridge	Oleg Brandt
138	UK	Liverpool	University of Liverpool	U Liverpool	Konstantinos Mavrokoridis
139	UK	Manchester	University of Manchester	U Manchester	Alexander Keshavarzi
140	USA	Boston	Boston University		Indara Suarez
141	USA	Upton	Brookhaven National Laboratory	BNL	George Iakovidis
142	USA	Durham	Duke University, Durham, NC		Seog Oh
143	USA	East Lansing	Facility for Rare Isotope Beams (FRIB), Michigan State University (MSU)	FRIB/MSU	Marco Cortesi
144	USA	Batavia	Fermi National Accelerator Laboratory	Fermilab	Alan Bross,
145	USA	Melbourne	Florida Institute of Technology	FIT	Marcus Hohlmann
146	USA	Bloomington	Indiana University		Tanaz Mohayai

147	USA	Notre Dame	Institute for Structure and Nuclear Astrophysics, University of Notre Dame	ISNAP	Tan Ahn
148	USA	Boston	Northeastern University		Darien Wood
149	USA	Los Angeles	Physics Department, Occidental College	OXY	Daniel Snowden-ifft
150	USA	New York	Stony Brook University	SBU	Evgeny Shulga
151	USA	Newport News	Thomas Jefferson National Accelerator Facility (TJNAF), Jefferson Lab	JLAB	Kondo Gnanvo
152	USA	Medford	Tufts University		Pierre-Hugues Beauchemin
153	USA	Davis	University of California, Davis		Robin Erbacher
154	USA	Irvine	University of California, Irvine		Anyes Taffard
155	USA	Boulder	University of Colorado Boulder	U Colorado	Alysia Diane Marino
156	USA	Gainesville	University of Florida		Katerina Kuznetsova
157	USA	Manoa	University of Hawai'i at Manoa	UH Manoa	Sven Vahsen
158	USA	Iowa City	University of Iowa		Yasar Onel
159	USA	Amherst	University of Massachusetts Amherst		Stephane Willocq
160	USA	Ann Arbo	University of Michigan		Bing Zhou
161	USA	Albuquerque	University of New Mexico	U New Mexico	Dinesh Loomba
162	USA	Columbia	University of South Carolina	U South Carolina	Roberto Petti
163	USA	Arlington	University of Texas at Arlington	UT Arlington	Andrew White
164	USA	Charlottesville	University of Virginia		Huong Nguyen
165	USA	Madison	University of Wisconsin-Madison	UW–Madison	Matthew F Herndon
166	USA	New Haven	University of Yale		Prakhar Garg

Research institutions, with commercial interests

ID	Country	Town	Collaborating Institution	Institution Code	Contact

167	Austria	Wiener Neustadt	EBG MedAustron GmbH		Sebastian Nowak
168	Italy	Trento	FBK		Richard Hall-Wilton
169	South Korea	Cheongju	Osong Medical Innovation Foundation	KBIOHEALTH	Won-Kyu Lee
170	South Korea	Seongnam-si	HFR	HFR	Chan-Yong Park
171	Switzerland	Geneva	SRS-Technology		Alexandru Rusu

Annex 2 Funding Agencies and their Representatives

ID	Country	Funding Agency	Funding Agency Code	Representative	Institutions represented[a]
1	Australia	Australian National University (ANU)		TBC	
2	Australia	University of Melbourne (U Melbourne)		TBC	
3	Belgium	Ghent University (UGent)		TBC	
4	Belgium	UCLouvain, Université catholique de Louvain (UCLouvain)		TBC	
5	Belgium	Université libre de Bruxelles (ULB)		TBC	
6	Belgium	Vrije Universiteit Brussel (VUB)		TBC	
7	Brazil	Centro Brasileiro de Pesquisas Físicas (Rio-CBPF)		TBC	
8	Brazil	Instituto de Física da Universidade de São Paulo (IFUSP)		TBC	
9	Brazil	Universidade do Estado do Rio de Janeiro (UERJ)		TBC	
10	Bulgaria	Institute for Nuclear Research and Nuclear Energy - Sofia (INRNE)		TBC	
11	Bulgaria	Sofia University St. Kliment Ohridski (U Sofia)		TBC	
12	Canada	Carleton University, Ottawa (U Carleton)		TBC	

[a] Only if different from Funding Agency

13	China	Chinese University of Hong Kong (CUHK)		TBC	
14	China	Hong Kong University (HKU)		TBC	
15	China	Hong Kong University of Science and Technology (HKUST		TBC	
16	China	Institute of High Energy Physics, CAS (IHEP CAS)		TBC	
17	China	Institute of Modern Physics, Chinese Academy of Sciences (IMP-CAS)		TBC	
18	China	Jiling University (U Jiling)		TBC	
19	China	Nankay University, Tianjin(U Nankay)		TBC	
20	China	Shandong University		TBC	
21	China	Shanghai Jiao Tong University		TBC	
22	China	Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (SIAT)		TBC	
23	China	Tsinghua University (U Tsinghua)		TBC	
24	China	University of Science and Technology of China (USTC)		TBC	
25	China	Wuhan University (U Wuhan)		TBC	
26	Colombia	Universidad de Antioquia, Medellin (U de Antioquia)		TBC	
27	Colombia	Universidad de Los Andes, Bogota' (U de Los Andes)		TBC	
28	Croatia	Ruder Boskovic Institute (RBI)		TBC	

29	Czech Republic	Institute of Experimental and Applied Physics, CTU in Prague (CTU)		TBC	
30	Finland	Helsinki Institute of Physics (HIP)		TBC	
31	Finland	University of Jyväskylä (U Jyväskylä)		TBC	
32	France	École Polytechnique de Paris, Omega Group (CNRS-IN2P3/Omega)		TBC	
33	France	Grand Accélérateur National d'Ions Lourds (GANIL)		TBC	
34	France	Institut de Physique des 2 Infinis de Lyon (IP2I)		TBC	
35	France	Institute of research into the fundamental laws of the Universe, CEA, Université Paris-Saclay (IRFU/CEA)		TBC	
36	France	Laboratoire de Physique de Clermont, LPC-Clermont-Ferrand		TBC	
37	France	Laboratoire de Physique Subatomique et Cosmologie (LPSC)-Grenoble (CNRS-IN2P3/UGA)		TBC	
38	France	Laboratoire Souterrain à Bas Bruit Avignon Université (CNRS-LSBB)		TBC	
39	France	Université Paris-Saclay (CNRS-IN2P3/IJCLab)		TBC	

40	Georgia	Georgian Technical University, Tbilisi		TBC	
41	Germany	Deutsches Elektronen-Synchrotron, Hamburg (DESY)		TBC	
42	Germany	Forschungszentrum Jülich GmbH (FZJ-GSI-U Bochum)		TBC	
43	Germany	Helmholtz-Institut für Strahlen- und Kernphysik, University of Bonn (HISKP Bonn)		TBC	
44	Germany	Helmholtzzentrum für Schwerioneforschung GSI GmbH (GSI)		TBC	
45	Germany	Institut of Experimental Physics, Hamburg University (U Hamburg)		TBC	
46	Germany	Johannes Gutenberg-University Mainz (JGU)		TBC	
47	Germany	Julius-Maximilians-University of Wurzburg (U Wurzburg)		TBC	
48	Germany	Ludwig-Maximilians-University of Munich (LMU)		TBC	
49	Germany	Max-Planck-Institute for Physics, Munich (MPP)		TBC	
50	Germany	Physikalisches Institut, Heidelberg University (U Heidelberg)		TBC	
51	Germany	Physikalisches Institut, University of Bonn (U Bonn)		TBC	
52	Germany	RWTH Aachen University III.		TBC	

		Physikalisches Institut (RWTH Aachen)			
53	Germany	Technische Universität Darmstadt		TBC	
54	Germany	TUM School of Natural Sciences Technische Universität München (TUM)		TBC	
55	Greece	General Secretariat for Research and Technology		TBC	Aristotle University of Thessaloniki (AUTH)
56	Greece	General Secretariat for Research and Technology		TBC	Institute of Nuclear and Particle Physics, National Center of Scientific Research Demokritos (NCSR Demokritos)
57	Greece	General Secretariat for Research and Technology		TBC	National Technical University Of Athens (NTU Athens)
58	Hungary	Wigner Research Centre for Physics (Wigner)		TBC	
59	India	Bose Institute (Bose)		TBC	
60	India	Indian Institute of Technology, Guwahati		TBC	
61	India	Indian Institute of Technology, Kanpur		TBC	
62	India	Indian Institute of Technology, Mandi		TBC	
63	India	National Institute of Science Education		TBC	

		and Research, Bhubaneswar (NISER Bhubaneswar)			
64	India	Punjab University, Chandigarh		TBC	
65	India	Saha Institute of Nuclear Physics (SINP Kolkata)		TBC	
66	India	University of Delhi (U Delhi)		TBC	
67	India	Variable Energy Cyclotron Centre (VECC Kolkata)		TBC	
68	Israel	Ben Gurion University of the Negev (Ben-Gurion U)		TBC	
69	Israel	Hebrew University of Jerusalem (HUJI)		TBC	
70	Israel	Weizmann Institute of Science (WIS)		TBC	
71	Italy	INFN		TBC	Gran Sasso Science Institute (GSSI)
72	Italy	INFN		TBC	INFN Laboratori Nazionali del Sud (INFN-LNS)
73	Italy	INFN		TBC	INFN Laboratori Nazionali di Frascati (INFN-LNF)
74	Italy	INFN		TBC	INFN Sezione di Bari (INFN-BA), University and Politecnico of Bari

75	Italy	INFN		TBC	INFN Sezione di Bologna (INFN-BO)
76	Italy	INFN		TBC	INFN Sezione di Ferrara (INFN-FE)
77	Italy	INFN		TBC	INFN Sezione di Lecce (INFN-LE), University of Salento
78	Italy	INFN		TBC	INFN Sezione di Napoli (INFN-NA), University of Napoli
79	Italy	INFN		TBC	INFN Sezione di Padova (INFN-PD)
80	Italy	INFN		TBC	INFN Sezione di Pavia (INFN-PV), University of Pavia
81	Italy	INFN		TBC	INFN Sezione di Pisa (INFN-PI)
82	Italy	INFN		TBC	INFN Sezione di Roma (INFN-RM1)
83	Italy	INFN		TBC	INFN Sezione di Roma Tor Vergata (INFN-RM2) , University of Roma Tor Vergata
84	Italy	INFN		TBC	INFN Sezione di Roma Tre (INFN-RM3)
85	Italy	INFN		TBC	INFN Sezione di Torino,

					University of Torino (INFN-TO)
86	Italy	INFN		TBC	INFN Sezione di Trieste (INFN-TS)
87	Italy	INFN		TBC	Università della Calabria and INFN Gruppo Collegato di Cosenza
88	Italy	University of Milano – Bicocca (UNIMIB)		TBC	
89	Japan	High Energy Accelerator Research Organization, Institute of Particle and Nuclear Studies (KEK-IPNS)		TBC	
90	Japan	Kobe University (U Kobe)		TBC	
91	Japan	Kyoto University (U Kyoto)		TBC	
92	Japan	RIKEN		TBC	
93	Japan	University of Iwate, Department of Physical Science and Materials Engineering (U Iwate)		TBC	
94	Kazakhstan	Institute of Nuclear Physics (INP-Almaty)		TBC	
95	Lithuania	Kaunas University of Technology (KTU)		TBC	
96	Poland	AGH University of Science and Technology in Krakow (AGH-Krakow)		TBC	
97	Poland	AstroCeNT, Nicolaus Copernicus Astronomical Center of the Polish		TBC	

		Academy of Sciences (AstroCeNT)			
98	Poland	Institute of Plasma Physics and Laser Microfusion (IPPLM)		TBC	
99	Poland	Jagiellonian University, Faculty of Physics, Astronomy and Applied Computer Science (JU-Krakow)		TBC	
100	Portugal	Coimbra University (Faculty of Sciences and Technology) (U Coimbra)		TBC	
101	Portugal	Laboratório de Instrumentação e Física Experimental de Partículas (LIP-Coimbra)		TBC	
102	Portugal	University of Aveiro (U Aveiro)		TBC	
103	Romania	Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering (IFIN-HH)		TBC	
104	Romania	National University of Science and Technology Politehnica Bucharest (UNSTPB)		TBC	
105	Romania	Transilvania University of Brasov		TBC	
106	Serbia	Institute of General and Physical Chemistry		TBC	
107	South Africa	University of Johannesburg (U Johannesburg)		TBC	
108	South Korea	Daegu Gyeongbuk Institute of Science		TBC	

		and Technology (DGIST)			
109	South Korea	Gangneung-Wonju National University (GWNU)		TBC	
110	South Korea	Hanyang University (HYU)		TBC	
111	South Korea	Seoul National University (SNU)		TBC	
112	South Korea	University of Seoul		TBC	
113	South Korea	Yonsei Cancer Center		TBC	
114	Spain	Centro de Astropartículas y Física de Altas Energías / Universidad de Zaragoza (U Zaragoza)		TBC	
115	Spain	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)		TBC	
116	Spain	Donostia International Physics Center (DIPC)		TBC	
117	Spain	Institut de Fisica d'Altes Energies (IFAE)		TBC	
118	Spain	Instituto de Física Corpuscular, CSIC & Universitat de València (IFIC)		TBC	
119	Spain	Instituto Galego de Física de Altas Enerxías / Universidade de Santiago de Compostela (USC/IGFAE)		TBC	

120	Spain	Universidad de Oviedo (U Oviedo)		TBC	
121	Spain	Universidad de Vigo		TBC	
122	Spain	Universidad Politécnica de Valencia		TBC	
123	Sweden	Department of Physics, University of Lund (U Lund)		TBC	
124	Sweden	European Spallation Source ERIC (ESS)		TBC	
125	Switzerland	European Organization for Nuclear Research (CERN)		TBC	
126	Switzerland	Paul Scherrer Institut (PSI)		TBC	
127	Switzerland	Université de Genève (U Genève)		TBC	
128	Taiwan	Academia Sinica		TBC	
129	Taiwan	National Central University		TBC	
130	Türkiye	Bolu Abant I˙zzet Baysal University (U Bolu-Abant)		TBC	
131	Türkiye	Bursa Uludag University (U Bursa)		TBC	
132	Türkiye	Istinye Üniversitesi (Istinye U)		TBC	
133	UK	Department of Physics, University of Warwick (U Warwick)		TBC	
134	UK	Imperial College		TBC	
135	UK	Royal Holloway, University of London		TBC	
136	UK	STFC Rutherford Appleton Laboratory (STFC-RAL)		TBC	
137	UK	University of Cambridge / Cavendish Laboratory (U Cambridge)		TBC	

138	UK	University of Liverpool (U Liverpool)		TBC	
139	UK	University of Manchester (U Manchester)		TBC	
140	USA	Boston University		TBC	
141	USA	Brookhaven National Laboratory (BNL)		TBC	
142	USA	Duke University, Durham, NC		TBC	
143	USA	Facility for Rare Isotope Beams (FRIB), Michigan State University (MSU)		TBC	
144	USA	Fermi National Accelerator Laboratory (Fermilab)		TBC	
145	USA	Florida Institute of Technology (FIT)		TBC	
146	USA	Indiana University		TBC	
147	USA	Institute for Structure and Nuclear Astrophysics, University of Notre Dame (ISNAP)		TBC	
148	USA	Northeastern University		TBC	
149	USA	Physics Department, Occidental College (OXY)		TBC	
150	USA	Stony Brook University (SBU)		TBC	
151	USA	Thomas Jefferson National Accelerator Facility (TJNAF), Jefferson Lab (JLAB)		TBC	
152	USA	Tufts University		TBC	
153	USA	University of California, Davis		TBC	

154	USA	University of California, Irvine		TBC	
155	USA	University of Colorado Boulder (U Colorado)		TBC	
156	USA	University of Florida		TBC	
157	USA	University of Hawai'i at Manoa (UH Manoa)		TBC	
158	USA	University of Iowa		TBC	
159	USA	University of Massachusetts Amherst		TBC	
160	USA	University of Michigan		TBC	
161	USA	University of New Mexico (U New Mexico)		TBC	
162	USA	University of South Carolina (U South Carolina)		TBC	
163	USA	University of Texas at Arlington (UT Arlington)		TBC	
164	USA	University of Virginia		TBC	
165	USA	University of Wisconsin-Madison (UW–Madison)		TBC	
166	USA	University of Yale		TBC	

Research institutions, with commercial interests

ID	Country	Funding Agency	Funding Agency Code	Representative	Institutions represented[b]
167	Austria	EBG MedAustron GmbH		TBC	
168	Italy	FBK		TBC	
169	South Korea	Osong Medical Innovation		TBC	

[b] Only if different from Funding Agency

		Foundation (KBIOHEALTH))			
170	South Korea	HFR		TBC	
171	Switzerland	SRS-Technology		TBC	

Annex 3 Equipment Structure and Technical Participation of the Collaborating Institutions

If applicable, the institute(s) in the list typeset in bold letters take(s) responsibility for the element of the equipment.

~~The institute(s) in the list typeset in bold letters take(s) responsibility for accomplishing the task, while the other institutes participate to the task.~~

Element of Equipment	Ownership	Location	Institution(s)

Annex 4 The Organisational Structure of the Collaboration

4.1 Management Plan and Structure of the Collaboration

Subject to the terms of this MoU, all persons who are members of the Collaboration shall have equal status in conducting the DRD1 R&D Programme, including full voting rights and the right to be considered for appointment to official functions related to the DRD1 R&D Programme.

4.1.1

The DRD1 R&D Programme shall be managed by the **Collaboration Board (CB)**, which shall comprise one representative per Collaborating Institution. The CB shall be actively involved in the preparation and running of the DRD1 R&D Programme. The CB is the highest institutional body of the DRD1 Collaboration, responsible for policy formulation and decision-making. It ensures equitable representation and oversees the strategic implementation of collaboration priorities. All scientific matters within the Collaboration are governed by the CB, which also coordinates financial planning, resource allocation, and manages the Common Fund. All scientific and technical issues are discussed in Collaboration Plenary Meetings before any major decisions are taken. The CB decides on detailed procedures for the management of the Collaboration, setting up specific bodies and functional positions for such tasks. Decisions within the CB are reached by consensus among eligible members, and in cases where consensus cannot be achieved, decisions are made by a vote of the CB.

4.1.2

The CB Chairperson chairs (4.1.10) the CB and nominate the **CB Secretary** from among the Members of the Collaboration for a period of two years. **CB comprises** one representative from each collaborating Institute (Annex 1) with voting rights, along with ex-officio members such as the two Spokespersons (4.1.11), CB Chair and Deputies (4.1.10), the CB Chair Advisory Group (if established, it will serve as an advisory body for the CB Chair), the Resource Coordinator (4.1.12), the Working Groups Coordinator (4.1.13), the Work Packages Coordinator (4.1.15), the Technical Coordinator (4.1.19) and the Deputy (4.1.20), the EXSO (4.1.21), the members of the Management Board (4.1.4), and the CB Secretary, who do not hold voting rights.

4.1.3

The **Management Board (MB)** supervises the progress of the work program along the lines defined by the CB and prepares decisions for and makes recommendations to the CB.

4.1.4

The Spokespersons chairs the MB and nominate the **MB Secretary** from among the Members of the Collaboration for a period of two years. The **MB comprises** the members elected by the CB from among the members of the Collaboration, the two Spokespersons, the CB Chair and the Deputies, the

Resource Coordinator, the Working Groups Coordinator, the Work Packages Coordinator, the Technical Coordinator and Deputy, the EXSO, and the MB Secretary.

4.1.5

The resources or the DRD1 R&D Programme shall be overseen by the **Resource Coordination Board (RCB)**, which shall comprise one representative per Funding Agency. The members of the Resources Coordination Board elect a chairperson, who shall be a member of the Resources Coordination Board. The Resources Board shall receive financial reports by the Resource Coordinator and shall be actively involved in the planning of the budgets. It shall also be actively involved in the creation, extension and premature termination of Work Packages and Working Groups. The RCB is responsible for reviewing resource and financial planning of the Collaboration and common funds. The RCB will regularly conduct internal acknowledgment of the resources allocated to Work Packages as described in Annex 7.

4.1.6

The Resource Coordinator chairs the Resource Coordination Board (RB)**. RCB comprises** one representative from each FA (Annex 2) with voting rights; the Spokespersons, the Resource Coordinator, the CB Chair and Deputies, the Working Groups Coordinator, the Work Packages Coordinator, the Technical Coordinator and the Deputy as ex-officio members, without voting rights. **RCB** will make decisions by consensus of the eligible members. In the case of a lack of consensus, RCB will make decisions by a vote. During the internal reviews of the resources allocated to Work Packages (Annex 7), each designated representative of the Funding Agencies participating in Work Packages, as specified in the corresponding annex, will be invited to these reviews with voting rights concerning decisions related to the Work Packages in which they are involved. The relevant Work Packages Leaders and the relevant Work Package Project Leaders will be invited and will be without voting rights.

4.1.7

The **Scientific Coordination Board (SCB)** supervises the scientific progress of the work program along the lines defined by the CB and makes recommendations to the MB and CB. The SCB will regularly conduct internal scientific endorsement of the Work Packages as described in Annex 7.

4.1.8

The Working Groups Coordinator and the Work Packages Coordinator chair the SBC and nominate the **SCB Secretary** from among the Members of the Collaboration for a period of two years. The **SBC comprises** the Working Groups Coordinator, the Working Group Conveners (4.1.14), the Work Packages Coordinator, the Work Package Leaders (4.1.16), the Work Package Project Leaders (4.1.17), the Liaison persons with the other DRDs (4.1.18), the two Spokespersons, the CB Chair and Deputies, the Technical Coordinator and Deputy, and the Resource Coordinator.

4.1.9

The work programme of the Collaboration is executed by working groups (Annex 8) lead by one or more **Working Group Conveners** and by work packages (Annex 7) lead by one or more **Work Package Leaders**. They report regularly to the SBC and MB.

4.1.10

The **CB Chairperson (CB Chair)** is elected by CB from among the Members of the Collaboration for a two-year term. The Chairperson, in turn, nominates CB Chair **Deputies** from among Collaboration members for a two-year term, subject to CB endorsement. Additionally, the CB Chair may appoint a **CB Chair Advisory Group** as needed to assist in CB affairs, with members of the Advisory Groups requiring endorsement by the CB.

4.1.11

Two S**pokespersons (SPs)** represent the Collaboration to the outside and lead the Collaboration in all day-to-day matters. They are elected by majority of the Collaboration Board and shall act within the framework of this MoU and such instructions as the Collaboration Board may give. The CB elects the SPs for two years. The two SPs agree, before implementation, upon the actions to be taken. In case they do not reach an agreement, the CB Chair will negotiate a common line of action. Where the Spokesperson is not stationed full-time at CERN, the Collaboration may also appoint a Contact Person at CERN.

4.1.12

The **Resource Coordinator (RC) is** nominated by the SPs and the CB Chair and endorsed by the MB and the CB, in agreement with CERN Management. The RC is elected from among the Members of the Collaboration for a period of two years. The RC is responsible for managing the Common Fund, following the deliberations of the CB. On a yearly base, the RC report to CB the financial status and the plannings. The RC will prepare CERN Financial Review.

4.1.13

The **Working Groups Coordinator (WGC)** is nominated by the SPs and the nomination is subject to CB and MB endorsement and approval. The WGC oversees all working groups activities and Common Projects.

4.1.14

The **Working Groups Conveners** are nominated by the SPs and the nomination is subject to CB and MB endorsement and approval. They coordinate the execution and monitor the progress of the working group (Annex 8) tasks as defined by the CB.

4.1.15

The **Work Packages Coordinator (WPC)** is nominated by the SPs and the nomination is subject to CB and MB endorsement and approval. The WPC oversees the work packages implementations and executions.

4.1.16

The **Work Package Leaders** are nominated by the Institutes Representatives that are part of the specific Work Package and the nomination is subject to MB ad CB endorsement. They coordinate the execution and monitor the progress of the work package (Annex 7).

4.1.17

When appropriate, the role of the **Work Package Leaders** is taken by the **Work Package Project Leaders that** are nominated by the Institutes Representatives that are part of the specific Work Package Project and the nomination is subject to MB ad CB endorsement. They coordinate the execution and monitor the progress of the work package project (Annex 7).

4.1.18

The **Liaison persons with the other DRDs** are nominated by SPs and are subject to CB and MB endorsement and approval.

4.1.19

The **Technical Coordinator (TC)** is nominated by SPs and it is subject to CB and MB endorsement and approval, in agreement with CERN Management. The TC supervises and coordinates all work by members of the Collaboration on the CERN site.

4.1.20

The **Deputy Technical Coordinator** (if present) is nominated by SPs and it is subject to endorsement and approval by the MB and CB, in coordination with CERN Management. The Deputy Technical Coordinator's role is to assist the TC, to oversee facilities outside of CERN and to facilitate access for collaboration members, to support the dissemination of technical advancements within the collaboration.

4.1.21

The **Experiment Safety Officer (EXSO)** is appointed by the Leader of the CERN Department responsible for the R&D programme of which the DRD1 R&D Programme is part on the proposal of the Spokesperson after consultation with the Collaboration Management. The rights and responsibilities of the EXSO are defined in the Safety Regulation SR-SO document.

4.1.22

Elected members of the DRD1 Management may be re-elected for further terms of office. Nominations of Spokespersons and Collaboration Board Chair following election by the Collaboration Board are for terms of two years each; the maximum number of consecutive years is four. All other nominations following election by the Collaboration Board and the Resources Board are for terms of two years each; re-elections are permitted.

4.2 Persons Currently Positions of Specific Responsibilities Within the Collaboration

Function	Name	Institute	Country
Collaboration Board Chairperson	Anna Colaleo	University and INFN Bari	Italy
Collaboration Board Deputy Chairperson	Leszek Ropelewski	CERN	Switzerland
Collaboration Board Secretary	Margherita Primavera	INFN Lecce	Italy
CB Chair Advisory Group	Markus Ball	University of Bonn	Germany
	Alberto Blanco	University of Coimbra	Portugal
	Alan Bross	Fermilab	USA
	Mary Cruz Fouz	CIEMAT	Spain
	Jianbei Liu	USTC	China
	Esther Ferrer Ribas	IRFU, CEA	France
Spokespersons	Eraldo Oliveri	CERN	Switzerland
	Maxim Titov	IRFU, CEA	France
Management Board Elected Members	Marcello Abbrescia	University and INFN Bari	Italy
	Amos Breskin	Weizmann Institute of Science	Israel
	Gabriel Charles	Université Paris-Saclay	France
	Paul Colas	IRFU, CEA, Uni. Paris-Saclay	France
	Nicola De Filippis	INFN and Politecnico of Bari	Italy
	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain
	Giuseppe Iaselli	INFN and Politecnico of Bari	Italy
	Mauro Iodice	INFN Roma Tre	Italy
	Jochen Kaminski	Physikalisches Institut, University of Bonn	Germany
	Thorsten Lux	(Institut de Física d'Altes Energies	Spain
	Michael Tytgat	Vrije Universiteit Brussel	Belgium
	Peter Wintz	Forschungszentrum Jülich GmbH and Ruhr-Universität Bochum	Germany

Management Board Members nominated by SPs	Kondo Gnanvo	TJNAF-JLAB	USA
	Natsuki Tomida	Kyoto University	Japan
	Andy White	University of Texas at Arlington	USA
Management Board Secretary	Gabriella Pugliese	INFN and Politecnico of Bari	Italy
Resource Coordinator	Fulvio Tessarotto	INFN Trieste	Italy
Deputy Resource Coordinator	Hans Taureg	Physikalisches Institut, University of Bonn	Germany
Technical Coordinator	Florian Brunbauer	CERN	Switzerland
EXSO (4.1.21)	Yorgos Tsipolitis	National Technical University Of Athens	Greece
Working Groups Coordinator	Beatrice Mandelli	CERN	Switzerland
Working Group 1 Conveners	Paul Colas	IRFU, CEA, Uni. Paris-Saclay	France
	Ingo-Martin Deppner	Physikalisches Institut, Heidelberg University	Germany
	Luca Moleri	Weizmann Institute of Science	Israel
	Emilio Radicioni	INFN - Bari	Italy
	Michael Tytgat	Vrije Universiteit Brussel	Belgium
	Peter Wintz	Forschungszentrum Jülich GmbH and Ruhr-Universität Bochum	Germany
Working Group 2 Conveners	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain
	Giulio Aielli	INFN Roma2, University Tor Vergata	Italy
	Riccardo Farinelli	INFN and University of Bologna	Italy
	Francisco Garcia Fuentes	Helsinki Institute of Physics	Finland
	Gabriella Pugliese	INFN and Politecnico of Bari	Italy
Working Group 3 Conveners	Beatrice Mandelli	CERN	Switzerland
	Gianfranco Morello	INFN Laboratori Nazionali di Frascati	Italy
	Alessandra Pastore	INFN Bari	Italy
	Francesco Renga	INFN Roma 1	Italy
	Stefan Roth	RWTH Aachen University III. Physikalisches Institut	Germany
Working Group 4 Conveners	Marcello Abbrescia	University and INFN Bari	Italy
	Maryna Borysova	Weizmann Institute of Science	Israel
	Paulo Fonte	LIP-Coimbra	Portugal
	Djunes Janssens	CERN	Switzerland
	Ozkan Sahin	Bursa Uludag University	Turkiye
	Rob Veenhof	CERN	Switzerland

	Piet Verwilligen	INFN Bari	Italy
Working Group 5 Conveners	Maxime Gouzevitch	Institut de Physique des 2 Infinis de Lyon	France
	Michael Lupberger	HISKP Bonn	Germany
	Sorin Martoiu	IFIN-HH	Romania
	Hans Muller	Univeristy of BONN	Germany
	Lucian Scharenberg	CERN	Switzerland
Working Group 6 Conveners	Rui De Oliveira	CERN	Switzerland
	Fabien Jeanneau	IRFU, CEA, Uni. Paris-Saclay	France
	Alain Delbart	IRFU, CEA, Uni. Paris-Saclay	France
	Giuseppe Iaselli	University and INFN Bari	Italy
	Gabriel Charles	Université Paris-Saclay	France
Working Group 7 Conveners	Karl Jonathan Floethner	CERN	Switzerland
	Roberto Guida	CERN	Switzerland
	Ekaterina Kuznetsova	University of Florida	USA
	Yorgos Tsipolitis	National Technical University Of Athens	Greece
Working Group 8 Conveners	Elisabetta Baracchini	Gran Sasso Science Institute	Italy
	Florian Brunbauer	CERN	Switzerland
	Raheema Hafeji	IGFAE/USC	Spain
	Mauro Iodice	INFN Roma Tre	Italy
Work Package Coordinators	Piotr Gasik	Helmholtzzentrum für Schwerioneforschung GSI GmbH	Germany
Work Package 1 Leaders	Giulio Aielli	INFN Roma2, University Tor Vergata	Italy
	Riccardo Farinelli	INFN Bologna	Italy
	Mauro Iodice	INFN Roma Tre	Italy
	Gabriella Pugliese	INFN and Politecnico of Bari	Italy
Work Package 2 Leader	Nicola De Filippis	INFN and Politecnico of Bari	Italy
Work Package 3 Leader	Peter Wintz	Forschungszentrum Jülich GmbH and Ruhr-Universität Bochum	Germany
Work Package 3 Project A Leaders	Oliver Kortner	Max-Planck-Institut fuer Physik , Werner-Heisenberg-Institute	Germany
	Junjie Zhu	Univeristy of Michigan	USA
Work Package 3 Project B Leader	Peter Wintz	Forschungszentrum Jülich GmbH and Ruhr-Universität Bochum	Germany
Work Package 3 Project C Leader	Daniel Bick	University Hamburg	Germany

Work Package 3 Project D Leader	Roberto Petti	University of South Carolina	USA
Work Package 3 Project E Leader	Temur Enik	INP-Almaty	Kazakhstan
Work Package 3 Project F Leader	Katerina Kuznetsova	University of Florida	USA
Work Package 4 Leader	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain
	Francisco Ignacio Garcia Fuentes	Helsinki Institute of Physics	Finland
	Jochen Kaminski	Physikalisches Institut, University of Bonn	Germany
Work Package 5 Leader	Imad Laktineh	Institut de Physique des 2 Infinis de Lyon	France
Work Package 6 Leaders	Shuddha Shankar Dasgupta	NISER Bhubaneswar	India
	Fulvio Tessarotto	INFN Trieste	Italy
Work Package 7 Leader	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain
Work Package 7 Project A Leader	Florian Maximilian Brunbauer	CERN	Switzerland
Work Package 7 Project B Leader	Ingo-Martin Deppner	Physikalisches Institut, Heidelberg University	Germany
Work Package 7 Project B Leader	Imad Laktineh	Institut de Physique des 2 Infinis de Lyon	France
Work Package 8 Leaders	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain
	Esther Ferrer Ribas	IRFU, CEA, Uni. Paris-Saclay	France
Work Package 8 Project A Leader	Alan Bross	Fermilab	USA
Work Package 8 Project B Leader	Marco Cortesi	FRIB, MSU	USA
Work Package 8 Project C Leader	Francesc Monrabal	Donostia International Physics Center	Spain
Work Package 8 Project D Leader	Giorgio Dho	INFN Laboratori Nazionali di Frascati	Italy
Work Package 9 Leaders	Jona Bortfeldt	Ludwig-Maximilians-University of Munich	Germany
	Gabriele Croci	University of Milano Bicooca	Italy
	Dezso Varga	HUN-REN Wigner Research Centre for Physics	Hungary
Liaison Person with DRD2	Diego Gonzalez Diaz	IGFAE, Uni. de Santiago de Compostela	Spain

Liaison Persn with DRD4	Fulvio Tessarotto	INFN Trieste	Italy
Liaison Person with DRD5	Florian Maximilian Brunbauer	CERN	Switzerland
Liaison Person with DRD6	Imad Laktineh	Institut de Physique des 2 Infinis de Lyon	France
Liaison Person with DRD7	Marco Bregant	Instituto de Física da Universidade de São Paulo	Brazil
	Sorin Matoiu	IFIN-HH	Romania

4.3 Collaboration By-Laws

The collaboration has no other by-laws apart from the current MoU.

Annex 5 Overview of the Financial Participation of the Funding Agencies

5.1 Common Fund

All Participating Institutions shall contribute a fixed yearly amount to the common Fund (cf. Article 7).

Per Participating Institution, the yearly contribution to the Common Fund amounts[c] to three thousand (3 000) Swiss francs.

5.2 Exception to Common Fund Contribution

Collaborating Institution	Contact	Funding Agency	Remarks	Collaboration Board Meeting[d]	CB Minutes

5.3 Resources for Work Packages, Working Groups and Other Work Entities

The use of common resources is decided by the DRD1 Collaboration Board on a yearly basis. The Resource Coordination Board of the Collaboration shall review once per year the functioning and use of the Common Fund. The Resource Coordinator shall report when required to CERN. The Resource Coordinator shall report annually to the autumn meeting of the Collaboration Board on the functioning and use of the Common Fund and shall point out any cases of default. At the same meeting, the Collaboration Board shall decide the Common Fund budget (allocation of Common Fund amounts to specific items, required contribution levels) for the following year. Increases in the Common Fund contributions are subject to the approval of the Funding Agencies. The CB shall base its decisions on submitted proposals and estimates (to be expressed in Swiss Francs unless exceptionally agreed otherwise). If, for any reason, the Collaboration Board should fail to reach agreement on the Common Fund costs or their sharing, the arrangements that it last agreed upon will continue to apply until agreement is reached.

The resources for Work Packages, Working Groups and Other Work Entities are set out in Annex 7, Annex 8 and Annex 9, respectively.

5.4 Procedure for the payment of Common Fund contributions

CERN will issue, each calendar year, on the basis of the agreed costs and sharing, invoices in Swiss Francs to the Funding Agencies of the various Institutes for payment during that year; any necessary adjustments will be made and taken into account in the following year. Payment of the amount

[c] To be discussed and agreed by the CB
[d] Date of the Collaboration Board Meeting when the exception has been approved by the Collaboration Board.

invoiced will be due not later than 10 June. Advance payments are encouraged. The Collaboration Board will be informed at its autumn meeting each year of the balance of the common fund.

Annex 6 Specific Obligations and Responsibilities of CERN as the Host Laboratory of the DRD1 Collaboration

6.1 Detector production facility at CERN

Access for members of the DRD1 Collaboration to detector production facilities at CERN, such as the EP-DT Micro Pattern Technology (MPT).

6.2 Test Beam

Access for members of the DRD1 Collaboration to test beam facilities at CERN and DRD1 dedicated slots in the EHN1/H4 line (PPE134).

6.3 Irradiation Facilities

Access for members of the DRD1 Collaboration to CERN irradiation facilities, in particular to GIF++.

6.4 Laboratories

Access for members of the DRD1 Collaboration to laboratories at CERN such as the Gaseous Detector Development (GDD)Laboratory and elsewhere when appropriate.

6.5 Computing resources

Access for members of the DRD1 Collaboration to CERN Computing resources in terms of processing, storage and software.

Annex 7 Work Packages

7.1 Establishment and conditions applicable to Work Packages, Annual Scientific and Financial Endorsement

A Work Package (WP) is established either as part of the initial DRD1 proposal or subsequently proposed to the Scientific Coordination Board (SCB) for endorsement and to the Collaboration Board (CB) for approval of its establishment. Once established, a Work Package will go through yearly scientific and resource approvals, following the procedure in Annex 7.2 and 7.3.

Institutes wishing to participate in a Work Package must be members of the DRD1 collaboration. Being involved in at least one task and one deliverable of the chosen WP is strongly recommended for membership. Each case will be individually evaluated and approved by the relevant WP Leaders.

Any institute is entitled to withdraw from a Work Package and terminate its obligations under the respective Work Package Annex by providing written notice of not less than six months to the Work Packages Coordinator, the relevant Work Package Leaders, the Spokespersons, the Collaboration Board Chair and Deputy and, if applicable, its Funding Agency/Agencies.

Upon the establishment of the Work Package, the Work Packages Coordinator (4.1.15) will nominate, in agreement with the Management Board (MB), an internal Referee. The Referee should be one of the members of the MB. The nomination must be endorsed by the SCB and the MB.

Work Package (WP) Leaders will present the scientific status of the Work Package for scientific endorsement once per year in a dedicated SCB+MB meeting, following the criteria detailed in Annex 7.2. Minutes of the meeting will serve as official reference.

After obtaining scientific endorsement, WP Leaders will present the resource status of the Work Package for resource approval once per year in dedicated RB+MB meetings and to relevant Work Package Funding Agencies (WP-FA), following the criteria detailed in Annex 7.3. Minutes of the meeting will serve as official reference.

The CB will be informed once per year about the annual endorsements from the SCB and RCB for the active Work Packages and will give final endorsement. Minutes of the meeting will serve as official reference.

7.2 Scientific Endorsement

During the SCB meeting dedicated to WP internal scientific endorsement, the WP leaders will present an overview of the WP proposal. The SCB session will be open, and all member of the Collaboration will be invited. This presentation should encompass:

- Alignment with relevant ECFA themes, referencing the ECFA Detector R&D Roadmap document.
- Progress in the scientific program and its objectives.
- A detailed list of milestones and expected deliverables.
- Collaboration and interaction with Working Groups (WGs), other Work Packages, and other DRDs.

- A resource table provided for informational purposes only, not for approval.

A closed session will follow the WP Leaders' presentation, involving the SCB and the MB, during which the designated internal DRD1 Referee will provide a comprehensive review of the proposal. The SCB and MB will then reach a consensus decision on whether to approve the WP. Minutes of the meeting will serve as official reference.

7.3 Resources Endorsement

During the RCB meeting dedicated to WP internal resource approval, the WP Leaders will present the WP resources. MB will be invited. All relevant WP Funding Agencies (WP-FA) listed in the Work Package Annexes (6.4.x) will be invited. The presentations will focus specifically on resource requirements and allocation.

To facilitate informed discussion, all relevant information for the presentation will be provided to the relevant WP-FA and RCB members at least one month in advance of the meeting, with the best effort. Before the RCB meeting, WP Leaders are responsible, irrespective of the nature of the feedback received, for organizing the timely collection and presentation of confirmations from the WP-FA to ensure that the proposed resource table accurately reflects their allocated funding and support. The method by which the proposed resource table will be acknowledged is left to each WP-FA, with the unique requirement that the acknowledgment is clear and unambiguous.

Work Package Annexes will document whether the WP-FA has acknowledged the resource tables or not. It is up to the Work Package Leaders to assess whether this will affect the membership of the corresponding group within the work package.

Following the presentation and discussion, the RCB will reach a consensus decision on WP approval. Minutes of the meeting will serve as official reference.

7.4 Work Packages

The following table will be kept up to date with the list of Work Packages.

WP ID	Title	Establishment Date	CB Approval or Extension Date[e]	CB Approval or Extension Minutes	Active or Completion Date
WP 1	Trackers, Hodoscopes, Large area muon systems	6.12.2023			
WP 2	Inner and central tracking with PID (Drift Chambers)	6.12.2023			
WP 3	Inner and central tracking with PID (Straw) – Project A:FCC	6.12.2023			
	Inner and central tracking with PID (Straw) – Project B: HAD	6.12.2023			
	Inner and central tracking with PID (Straw) – Project C: DM	6.12.2023			
	Inner and central tracking with PID (Straw) – Project D: NEU	6.12.2023			
	Inner and central tracking with PID (Straw) – Project E: MPT	6.12.2023			
	Inner and central tracking with PID (Straw) – Project F: RO	6.12.2023			
WP 4	Inner and central tracking with PID (Tracking TPCs)	6.12.2023			
WP 5	Calorimetry	6.12.2023			
WP 6	Gaseous photon detectors	6.12.2023			
WP 7	Gaseous timing detectors , Project A (MPGD)	6.12.2023			
	Gaseous timing detectors , Project B (RPC)	6.12.2023			

[e] The CB approval, as reported in Annex 7.1, is the final endorsement that follows the scientific and resource approvals done by the Scientific Coordination Board and the Resource Coordination Board, respectively. The dates of the respective meetings are reported in the Work Package Annex.

WP 8	Reaction/Decay TPCs, Project A:High Pressure TPCs for precision studies of neutrino interactions	6.12.2023			
	Reaction/Decay TPCs, Project B: TPCs for low-energy nuclear physics	6.12.2023			
	Reaction/Decay TPCs, Project C: Electroluminescence-based TPCs for Rare-Event Searches and other R&D on pure noble-gas amplification	6.12.2023			
	Reaction/Decay TPCs, Project D: Radiopure and/or low-energy TPCs for precise track imaging and/or calorimetry with avalanche-based readouts	6.12.2023			
WP 9	BHEP Applications	6.12.2023			

7.4.1 Work Package 1 - Trackers, Hodoscopes, Large area muon systems

COMMENT (to be removed from final version)
The following text represents the Work Package Annex that will be part of the DRD1 MoU before the MoU signature. The Work Package Annex after the scientific and resource approval of the Scientific Coordination Board, the Resource Coordination Board and the Collaboration Board is at the end of this draft.

7.4.1.1 Description

The project's primary objective is to advance R&D in resistive gaseous detectors for trackers, hodoscopes, and large-area muon systems at future facilities. The goal is to enhance their stability, robustness, long-term performance, and cost-effective manufacturing with industrial partners.

The Work Package groups the following Tasks.

Task ID	Task	Performance Goal	ECFA DRD Theme
T1	New RPC structures	Achieve RPCs and TGC with a high-rate capability (ranging from 10kHz/cm2 to 1MHz/cm2) and/or improved timing resolution (reaching sub-ns to ps levels) using new resistive materials and fine structure.	1.1, 1.3
T2	New Resistive MPGD Structures	Development of large area resistive MPGD capable of efficient and stable operation under conditions of high rates (D2.1) as well as low/medium rates (D2.2)	
T3	New Front-end electronics	Frontend operation up to 0.1-1 GHz; High density channel; Radiation hardness; time resolution (< 10 ps); local zero suppression; higher FE gain amplification	
T4	Optimization of scalable multichannel readout systems	Development of novel Scalable Readout Systems for Gaseous Detectors. Development of new FPGA-based readout system that matches the data throughput of the electronics	
T5	Eco-friendly gases	Reduce the GHG emission from the detectors and define new ecological gas mixture that keeps similar performance of the current gas mixture	
T6	Manufacturing	Constructing and exploring cost-effective methods for producing high-quality, high-performance large area resistive MPGD and new RPC suitable for low to medium rates with industrial production.	
T7	Longevity on large detector areas	Ensure operation of gaseous detectors without ageing effects with optimal and/or eco-friendly gas mixtures up to integrated charges in the order of C/cm^2	
T8	New detector structures	Develop new detector structure and hybrid system exploiting new ideas and established technologies to explore new frontiers in gaseous detectors	

7.4.1.2 Start And End Date, Deliverables and Time Scale

The Work Package starts on January 1st, 2024 and ends on December 31st, 2026.

Overall[f] Work Package Milestones and Deliverables and time scales are indicated in the table below.

Milestones and Deliverables	Title	Description	Start Date	End Date

[f] Details of Tasks, Milestones and Deliverables can be requested from the Collaboration Management (Co-Spokespersons and Work Packages Leader)

.

M1.1.1	Review of Detector Prototypes	Examining the status and future prospects of innovative resistive materials, novel structures, and challenges in hybridizing Resistive Plate Chambers (RPC) and Micro-Pattern Gas Detectors (MPGD). This evaluation includes compiling of a comprehensive report highlighting comparative performance, along with the respective advantages and disadvantages of available technologies [T1, T2, T5, T6, T7, T8]	0	12M
M1.1.2	Detector Prototypes Enhancement	Building upon the insights from M1.1. Proof of rate capability above 100 kHz/cm2, assessing the status and potential improvements of RPC and MPGD detectors, informed by feedback from the previous phase. [T1, T2, T5, T6, T7, T8]	12M	24M
D1.1	Large area RPC and MPGD prototypes	Design, construction, and test of RPC and MPGD-based prototypes [T1, T2] with advanced solutions for extensive surface coverage [T6], optimized for medium-high flow rates (range tens kHz/cm2 – few MHz/cm2), precise tracking (100 μm) and timing (few ns). This includes considerations for the compatibility of eco-friendly gases. [T5, T7]	0	36M
M1.2.1	Review of the status of the art of ASICs and DAQ systems	Definition of requirements for next generation large area muon systems [T3, T4]	0	12M
M1.2.2	Design and Simulation studies of new ASIC	Design and Simulation studies of new ASICs building blocks for MPGD and RPC and technical note(s) about the chips expected performance [T3]	12M	24M
M1.2.3	Design of novel Scalable Readout Systems for Gaseous Detectors	Assessment of performance achievements based on DAQ modelling [T4]	0	24M
D1.2	New frontend and DAQ systems	Completion of the innovative ASICs' final design; compilation of comprehensive production documentation; if applicable, initiation of the engineering run for the first chip, should it be in an advanced stage [T3]. DAQ system prototyping for gaseous detectors, aiming to push the boundaries in terms of timing, radiation resistance, multi-channel	0	36M

		high-rate acquisition and performance, for large systems [T4].		

7.4.1.3 Participating Institutions

Expression of interest (EOI) from DRD1 members to be part of the work package. The contact person for each group is listed, and the deliverables in which they plan to be involved are indicated.

Country	Collaborating Institution (EOI)	Town	Contact	Deliverables
Italy	INFN Bari	Bari	A. Pastore	D1.1
Italy	INFN Bologna	Bologna	P. Giacomelli	D1.1, D1.2
Italy	INFN Ferrara	Ferrara	G. Cibinetto R. Farinelli	D1.1, D1.2
Italy	INFN Laboratori Nazionali di Frascati (LNF)	Frascati	G. Bencivenni M. Poli Lener D. Piccolo A. Paoloni	D1.1
Italy	INFN Napoli	Napoli	M. Della Pietra	D1.1
Italy	INFN Roma Tor Vergata	Rome	P. Camarri	D1.1, D1.2
Italy	INFN Roma Tre	Rome	M. Iodice	D1.1
Italy	INFN Torino	Torino	M. Greco	D1.2
Japan	Kobe University	Kobe	K. Miuchi	D1.1
Switzerland	CERN	Geneva	E. Oliveri	D1.1, D1.2
UK	University of Cambridge	Cambridge	O. Brandt	D1.1
Germany	Ludwig Maximilian University of Munich	Munich	O. Biebel	D1.1
Spain	University of Oviedo and ICTEA	Oviedo	B. Alvarez Gonzalez	D1.2
Spain	CIEMAT	Madrid	M.C. Fouz C.F. Bedoya	D1.2
Hungary	Wigner Research Centre for Physics	Budapest	D. Varga	D1.1, D1.2
Germany	Max-Planck-Institute for Physics	Munich	O. Kortner	D1.1
Switzerland	University of Geneva	Geneva	L. Paolozzi	D1.1
China	Hong Kong Cluster	Hong Kong	Y. Tu	D1.1
Israel	Weizmann Institute of Science	Rehovot	S. Bressler	D1.1
France	CEA/Saclay IRFU	Saclay	M. Vandenbroucke	D1.1, D1.2

China	University of Science and Technology of China	Hefei	J. Liu	D1.1
Belgium	Vrije Universiteit Brussel	Brussels	M. Tytgat	D1.1
Romania	IFIN-HH	Bucharest	S. Martoiu	D1.1, D1.2
Romania	National University of Science and Technology Politehnica Bucharest	Bucharest	C. Bira	D1.1, D1.2
Romania	University Transilvania Brasov	Brasov	S. Popa	D1.2
Türkiye	Istinye University	Istanbul	S. Ali Çetin	D1.1, D1.2
USA	e+e- US Cluster		G. Iakovidis, B. Zhou, M. Hohlmann	D1.1, D1.2
Serbia	Institute of General and Physical Chemistry	Belgrade	D. Milovanovic	D1.1

7.4.1.4 Work Package Funding Agencies (WP-FA)

The list of Funding Agencies and Representatives will be updated according to the following table after the first scientific and resource endorsement of the Work Package by the Collaboration Board.

Country	Funding Agency	Representative	Institutions represented[g]

7.4.1.5 Contributions of Participating Institutions to the Work Package[h]

After the first scientific and resource endorsement of the Work Package by the Collaboration Board, cost and person-power estimations for the lifetime of each deliverables will be updated according to the following table.

Deliverable	Institution	Investment (kCHF)	Person Power[i] (FTE/y)
D			
D Total			

7.4.1.6 Management Structure of the Task

The management structure of the Task is described in Annex 4.1.

[g] Only if different from Funding Agency
[h] Details of the involvement of funding agencies can be requested by the funding agencies involved in the work package from the Collaboration Management (Co-Spokespersons and Resource Coordinator)
[i] If relevant, percentages of permanent physicists and post-docs/Students/Engineers and Technicians will be listed.

7.4.1.7 Persons Currently Holding Functions of Specific Responsibility in the Task

Function	Name	Institute
Work Package Leader	Giulio Aielli	INFN Tor Vergata
Work Package Leader	Riccardo Farinelli	INFN Bologna
Work Package Leader	Mauro Iodice	INFN Roma 3
Work Package Leader	Gabriella Pugliese	INFN Bari

7.4.1.8 Approvals

The Work Package has been established at the submission of the DRD1 proposal on 6.12.2023 and the establishment has been endorsed by the Collaboration Board in its meeting on date February 1st, 2024.

7.4.2 Work Package 2

(similar to 1)

7.4.3 Work Package 3

(similar to 1)

Annex 8 Working Groups

The Collaboration is organized into eight Working Groups (WGs) that coordinate R&D efforts. These WGs serve as hubs for knowledge and technology, based on transversal and distributed support to R&D activities and centralized facilities. The activities of the Working Groups support the research and development work of individual groups, valorize the contributions of each institute while preserving their identity, and offer the possibility of having an advanced R&D framework. The WG should facilitate the exchange of ideas and foster synergies between institutes as well as it will serve as knowledge and technology hub for developing gaseous detector technologies. Each WGs is guided by conveners who play a pivotal role in facilitating the group's activities and carrying out the DRD1 scientific work program.

In th efollwoing table, the DRD1 Working Groups are listed.

Working Group	Description
WG1	Technological Aspects and Developments of New Detector Structures, Common Characterization and Physics Issues
WG2	Applications
WG3	Gas and Materials
WG4	Modelling and Simulations
WG5	Electronics for gaseous detectors
WG6	Production and Technology Transfer
WG7	Collaboration Laboratories and Facilities
WG8	Knowledge Transfer, Training, Career Promotion

8.1 Working Group 1: Technological Aspects and Developments of New Detector Structures, Common Characterization and Physics Issues

8.1.1 Description

A large variety of technologies have to be developed to cover the needs of future experiments with cost-awareness and sustainability concerns. Improving existing detectors to make them larger, working at higher rates or lower backgrounds, with better stability and improved performance, will require new technologies and development. Working group 1 will study and monitor the progress in wire, RPC, MPGD and TPC technologies.

8.1.2 Common Objectives and Time Scale

The aim of the working group is to provide a forum for discussion about Gaseous Detector Technologies. There are no deliverables foreseen. The working group is created without any defined end date. Common Objectives will guide the common activities organized by Working Group 1.

Common Objectives	Time frame (if applicable)
Collaboration Meeting Sessions	About 3 Meeting per year
Topical Workshops	Several per year
Support to Gaseous Detector Conferences	
Support to Common Project	

8.1.3 Participating Institutions

All the Institutes in the Collaboration are participating institutes in the Working Group activities.

8.1.4 Funding Agencies

The Working Group activities are supported by the DRD1 Common Fund.

8.1.5 Contributions of Participating Institutions to the Working Group

The estimations in the table below are the person-power (FTE, or full time equivalent) for exceptional contribution to the operation of the working group.

Institution	Permanent physicists and post-docs (FTE)
Total	

8.1.6 Management Structure of the Working Group

The management structure of the working group is described in **Annex 4.1.**

8.1.7 Persons Currently Holding Functions of Specific Responsibility in the Working Group

Function	Name	Institute
Working Group Convener	Paul Colas	CEA/IRFU
Working Group Convener	Ingo Martin Deppner	GSI
Working Group Convener	Emilio Radicioni	INFN Bari
Working Group Convener	Luca Moleri	Weizmann Institute of Science
Working Group Convener	Michael Tytgat	Vrije Universiteit Brussel
Working Group Convener	Peter Wintz	IKP, FZ Jülich

8.1.8 Approvals

The creation of the working group was approved by the Collaboration Board in its meeting on date February 1st, 2024.

8.2 Working Group 2: Applications

(similar to 8.1)

Annex 9 Collaborative Activities

The Collaboration establish the following collaborative activities between members of the collaboration:
- Common Projects
- Common Investments

9.1 Common Project

The DRD1 Common Projects cover areas of common interest to the DRD1 community, such as:

- Technology R&D projects aimed at developing novel techniques, improving existing technologies, characterization methods, and dedicated tools.
- Development and optimization of gaseous detectors for novel applications.
- Enhancement of technology transfer of gaseous detectors to industry.

The rules governing Common Projects and the support from the Collaboration Common Fund are approved by the Collaboration Board.
The DRD1 Management Board, in consultation with the Scientific Coordination Board, will establish these rules, which will be approved by the Collaboration Board (CB). The Scientific Coordination Board (SCB) members, along with a few selected experts, will evaluate submitted proposals, make decisions about project acceptance, and inform the CB.
The rules of the Common Projects that the Collaboration Board must approve will include:

- The frequency of the call for applications.
- The duration of a Common Project.
- The minimum number of regular members of the DRD1 collaboration required as participating institutes in the Common Project.
- The maximum number of projects per year.
- The maximum annual contribution from the Common Fund per Common Project.
- The maximum annual contribution from the Common Fund per Institute.
- The percentage of the total project cost that must be provided by the participating institutes to complement the DRD1 Common Fund contribution.

9.2 Common Investment

Independently from the DRD1 Common Fund, Parties to the DRD1 Collaboration may agree amongst themselves to share costs for common projects or investments, such as purchase of equipment, material, submission of wafer production or other procurements. The Collaboration shall be informed about such agreements.

Annex 10 Included Background IP

Collaborating Institution	Intellectual Property	Restrictions

Annex 11 Conflict of Interest Disclosure Form

Conflict of Interest Disclosure Form

I am aware of and have read the content of the Confidentiality and Conflict of Interest Declaration Policy applicable to the meetings of the Collaboration Board and the Resources Board of the DRDn Collaboration.

In accordance with the Confidentiality and Conflict of Interest Declaration Policy, "Conflict of Interest" means a situation in which an individual or entity is confronted with conflicting loyalties or interests that have the potential to undermine their capacity to make impartial decisions. This conflict could arise, among others, from personal, financial, or external affiliations.

This Conflict of Interest Form should indicate whether the Party Representative has, or is subject to any potential Conflict of Interest.

Please describe below any relationships, transactions, positions you hold (volunteer or otherwise), or circumstances that you believe could contribute to a Conflict of Interest:

☐ I have no Conflict of Interest to report.

☐ I have the following Conflict of Interest to report (please specify any nonprofit and for-profit boards you sit on, any for-profit businesses which you or an immediate family member own, shareholder, or has a managerial position, or any industrial sponsor research your team benefits from):

1. …
2. …
3. …

I hereby certify that the information set forth above is true and complete to the best of my knowledge.

Signed in …… on……

<NAME OF
AUTHORIZED REPRESENTATIVE>
<FUNCTION>

<ADDRESS FOR CORRESPONDENCE>

Annex 12 CERN General Conditions Applicable to Experiments

--- Work Package Annex (After MoU Signature) ---

In the next pages, the format of the Work Package MoU Annexes after signature is presented.

7.4.1 Work Package 1 - Trackers, Hodoscopes, Large area muon systems

6.4.1 The following text represents the Work Package Annex that will be part of the DRD1 MoU once the Work Package has been approved scientifically and resource-wise but the Scientific Coordination Board, the Resource Coordination Board and the Collaboration Board.

7.4.1.1 Description

The project's primary objective is to advance R&D in resistive gaseous detectors for trackers, hodoscopes, and large-area muon systems at future facilities. The goal is to enhance their stability, robustness, long-term performance, and cost-effective manufacturing with industrial partners.

The Work Package groups the following Tasks.

Task ID	Task	Performance Goal	ECFA DRD Theme
T1	New RPC structures	Achieve RPCs and TGC with a high-rate capability (ranging from 10kHz/cm2 to 1MHz/cm2) and/or improved timing resolution (reaching sub-ns to ps levels) using new resistive materials and fine structure.	1.1, 1.3
T2	New Resistive MPGD Structures	Development of large area resistive MPGD capable of efficient and stable operation under conditions of high rates (D2.1) as well as low/medium rates (D2.2)	
T3	New Front-end electronics	Frontend operation up to 0.1-1 GHz; High density channel; Radiation hardness; time resolution (< 10 ps); local zero suppression; higher FE gain amplification	
T4	Optimization of scalable multichannel readout systems	Development of novel Scalable Readout Systems for Gaseous Detectors. Development of new FPGA-based readout system that matches the data throughput of the electronics	
T5	Eco-friendly gases	Reduce the GHG emission from the detectors and define new ecological gas mixture that keeps similar performance of the current gas mixture	
T6	Manufacturing	Constructing and exploring cost-effective methods for producing high-quality, high-performance large area resistive MPGD and new RPC suitable for low to medium rates with industrial production.	
T7	Longevity on large detector areas	Ensure operation of gaseous detectors without ageing effects with optimal and/or eco-friendly gas mixtures up to integrated charges in the order of C/cm^2	
T8	New detector structures	Develop new detector structure and hybrid system exploiting new ideas and established technologies to explore new frontiers in gaseous detectors	

7.4.1.2 Start And End Date, Deliverables and Time Scale

The Work Package starts on January 1st, 2024 and ends on December 31st, 2026.

Overall[j] Work Package Milestones and Deliverables and time scales are indicated in the table below.

Milestones and Deliverables	Title	Description	Start Date	End Date

[j] Details of Tasks, Milestones and Deliverables can be requested from the Collaboration Management (Co-Spokespersons and Work Packages Leader)

.

M1.1.1	Review of Detector Prototypes	Examining the status and future prospects of innovative resistive materials, novel structures, and challenges in hybridizing Resistive Plate Chambers (RPC) and Micro-Pattern Gas Detectors (MPGD). This evaluation includes compiling of a comprehensive report highlighting comparative performance, along with the respective advantages and disadvantages of available technologies [T1, T2, T5, T6, T7, T8]	0	12M
M1.1.2	Detector Prototypes Enhancement	Building upon the insights from M1.1. Proof of rate capability above 100 kHz/cm2, assessing the status and potential improvements of RPC and MPGD detectors, informed by feedback from the previous phase. [T1, T2, T5, T6, T7, T8]	12M	24M
D1.1	Large area RPC and MPGD prototypes	Design, construction, and test of RPC and MPGD-based prototypes [T1, T2] with advanced solutions for extensive surface coverage [T6], optimized for medium-high flow rates (range tens kHz/cm2 – few MHz/cm2), precise tracking (100 μm) and timing (few ns). This includes considerations for the compatibility of eco-friendly gases. [T5, T7]	0	36M
M1.2.1	Review of the status of the art of ASICs and DAQ systems	Definition of requirements for next generation large area muon systems [T3, T4]	0	12M
M1.2.2	Design and Simulation studies of new ASIC	Design and Simulation studies of new ASICs building blocks for MPGD and RPC and technical note(s) about the chips expected performance [T3]	12M	24M
M1.2.3	Design of novel Scalable Readout Systems for Gaseous Detectors	Assessment of performance achievements based on DAQ modelling [T4]	0	24M
D1.2	New frontend and DAQ systems	Completion of the innovative ASICs' final design; compilation of comprehensive production documentation; if applicable, initiation of the engineering run for the first chip, should it be in an advanced stage [T3]. DAQ system prototyping for gaseous detectors, aiming to push the boundaries in terms of timing, radiation resistance, multi-channel	0	36M

		high-rate acquisition and performance, for large systems [T4].		

7.4.1.3 Participating Institutions

Country	Collaborating Institution	Town	Contact	Deliverables
Italy	INFN Bari	Bari	A. Pastore	D1.1
Italy	INFN Bologna	Bologna	P. Giacomelli	D1.1, D1.2
Italy	INFN Ferrara	Ferrara	G. Cibinetto R. Farinelli	D1.1, D1.2
Italy	INFN Laboratori Nazionali di Frascati (LNF)	Frascati	G. Bencivenni M. Poli Lener D. Piccolo A. Paoloni	D1.1
Italy	INFN Napoli	Napoli	M. Della Pietra	D1.1
Italy	INFN Roma Tor Vergata	Rome	P. Camarri	D1.1, D1.2
Italy	INFN Roma Tre	Rome	M. Iodice	D1.1
Italy	INFN Torino	Torino	M. Greco	D1.2
Japan	Kobe University	Kobe	K. Miuchi	D1.1
Switzerland	CERN	Geneva	E. Oliveri	D1.1, D1.2
UK	University of Cambridge	Cambridge	O. Brandt	D1.1
Germany	Ludwig Maximilian University of Munich	Munich	O. Biebel	D1.1
Spain	University of Oviedo and ICTEA	Oviedo	B. Alvarez Gonzalez	D1.2
Spain	CIEMAT	Madrid	M.C. Fouz C.F. Bedoya	D1.2
Hungary	Wigner Research Centre for Physics	Budapest	D. Varga	D1.1, D1.2
Germany	Max-Planck-Institute for Physics	Munich	O. Kortner	D1.1
Switzerland	University of Geneva	Geneva	L. Paolozzi	D1.1
China	Hong Kong Cluster	Hong Kong	Y. Tu	D1.1
Israel	Weizmann Institute of Science	Rehovot	S. Bressler	D1.1
France	CEA/Saclay IRFU	Saclay	M. Vandenbroucke	D1.1, D1.2
China	University of Science and Technology of China	Hefei	J. Liu	D1.1

Belgium	Vrije Universiteit Brussel	Brussels	M. Tytgat	D1.1
Romania	IFIN-HH	Bucharest	S. Martoiu	D1.1, D1.2
Romania	National University of Science and Technology Politehnica Bucharest	Bucharest	C. Bira	D1.1, D1.2
Romania	University Transilvania Brasov	Brasov	S. Popa	D1.2
Türkiye	Istinye University	Istanbul	S. Ali Çetin	D1.1, D1.2
USA	e+e- US Cluster		G. Iakovidis, B. Zhou, M. Hohlmann	D1.1, D1.2
Serbia	Institute of General and Physical Chemistry	Belgrade	D. Milovanovic	D1.1

7.4.1.4 Work Package Funding Agencies (WP-FA)

Country	Funding Agency	Representative	Institutions represented[k]
Belgium	Vrije Universiteit Brussel (VUB)	TBC	
CERN	European Organization for Nuclear Research(CERN)	TBC	
China	University of Science and Technology of China (USTC)	TBC	
France	Institute of Research into the fundamental laws of the Universe, CEA, Université Paris-Saclay(IRFU/CEA)	TBC	
Germany	Julius-Maximilians-University of Wurzburg (UWurzburg)	TBC	
Germany	Ludwig-Maximilians-University of Munich(LMU)	TBC	
Germany	Max-Planck-Institute for Physics, Munich(MPP)	TBC	
Hong Kong	Hong Kong University of Science and Technology(HKUST)	TBC	
Hong Kong	Hong Kong University (HKU)	TBC	
Hungary	Wigner Research Centre for Physics(Wigner)	TBC	
Israel	Weizmann Institute of Science (WIS)	TBC	
Italy	Istituto Nazionale di Fisica Nucleare (INFN)	TBC	INFN Bari, INFN Bologna,

[k] Only if different from Funding Agency

			INFN Ferrara, INFN LNF, INFN Napoli, INFN Roma Tor Vergata, INFN Roma Tre, INFN Torino
Japan	Kobe University (UKobe)	TBC	
Romania	National University of Science and Technology Politehnica Bucharest(UNSTPB)	TBC	
Romania	University of Brasov	TBC	
Romania	Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering(IFIN-HH)	TBC	
Serbia	University of Belgrade, Institute of General and Physical Chemistry	TBC	
Spain	Universidad de Oviedo (U Oviedo)	TBC	
Spain	Centro deInvestigacionesEnergéticas,Medioambientales yTecnológicas (CIEMAT)	TBC	
Switzelrand	Université de Genève (U Genève)	TBC	
Turkiye	Istinye Üniversitesi (Istinye U)	TBC	
UK	University of Cambridge Cavendish Laboratory (UCambridge)	TBC	
USA	University of Florida	TBC	
USA	US Thomas Jefferson National Accelerator facility	TBC	

7.4.1.5 Contributions of Participating Institutions to the Work Package[l]

The estimations in the table below are the person-power (FTE, or full time equivalent) and costs for designing, constructing and testing XXX for the lifetime of the Deliverable.

Deliverable	Institution	Investment (kCHF)	Person Power[m] (FTE/y)
D1.1	INFN-BA	###	#.#
	INFN-BO	###	#.#
	INFN-FE	###	#.#
	INFN-LNF	###	#.#
	INFN-NA	###	#.#

[l] Details of the involvement of funding agencies can be requested by the funding agencies involved in the work package from the Collaboration Management (Co-Spokespersons and Resource Coordinator)

[m] If relevant, percentages of permanent physicists and post-docs/Students/Engineers and Technicians will be listed.

	INFN-RM2	###	#.#
	INFN-RM3	###	#.#
	Kobe	###	#.#
	CERN	###	#.#
	U. Cambridge	###	#.#
	LMU	###	#.#
	Wigner RCP	###	#.#
	Max Plank	###	#.#
	University of Geneva	###	#.#
	Hong Kong	###	#.#
	Weizmann	###	#.#
	IRFU	###	#.#
	USTC	###	#.#
	VUB	###	#.#
	IFIN-HH	###	#.#
	UNSTPB	###	#.#
	ISU	###	#.#
	e+e- US Cluster	###	#.#
	IGPC Belgrade	###	#.#
D1.1 Total		####	##.#
	INFN-BO	###	#.#
	INFN-FE	###	#.#
	INFN-RM2	###	#.#
	INFN-TO	###	#.#
	CERN	###	#.#
	ICTEA U Oviedo	###	#.#
	CIEMAT	###	#.#
	Wigner RCP	###	#.#
	IRFU	###	#.#
	IFIN-HH	###	#.#
	UNSTPB	###	#.#
	UniTBv	###	#.#
	ISU	###	#.#
	e+e- US Cluster	###	#.#
D1.2 Total		####	##.#
WP Total		####	##.#

NOT PRESENT AT THE MoU Signature (SCB, RCB and CB Endorsement Required) – The level of details that will be shown in the table will be discussed with CERN, involved Institutes and WP Funding Agencies before the signature of the MoU.

7.4.1.6 Management Structure of the Task

The management structure of the Task is described in Annex 4.1.

7.4.1.7 Persons Currently Holding Functions of Specific Responsibility in the Task

Function	Name	Institute
Work Package Leader	Giulio Aielli	INFN Tor Vergata
Work Package Leader	Riccardo Farinelli	INFN Bologna
Work Package Leader	Mauro Iodice	INFN Roma 3
Work Package Leader	Gabriella Pugliese	INFN Bari

7.4.1.8 Approvals

The Work Package was approved by the Scientific Coordination Board in its meeting on date, by the Resources Board in its meeting on date and by the Collaboration Board in its meeting on date. All contributing Funding Agencies agreed to its creation.

Excerpt from the approved minutes of the Scientific Coordination Board meeting on date:
Excerpt

Excerpt from the approved minutes of the Resources Coordination Board meeting on date:
Excerpt

Excerpt from the approved minutes of the Collaboration Board meeting on date:
Excerpt

Approval of Funding Agencies concerned:

Funding Agency	Approval
Funding Agency A	Vote in Resources Board meeting (see above)
Funding Agency B	Notice of funding grant to institution X (copy attached)
Funding Agency C	Vote in Resources Board meeting (see above)
Funding Agency D	Vote in Resources Board meeting (see above)
Funding Agency E	Letter confirming approval (copy attached)