DRD-on-Calorimetry
Welcome to Collaboration Meeting

Roman Pöschl

On behalf of DRD Calo Proposal Team

DRD Calo – Collaboration Meeting April 2024

DRD Calo - Proposal Team

Coordinators: Roberto Ferrari, Gabriella Gaudio (INFN-Pavia), R.P. (IJCLab)

Representative from ECFA Detector R&D Roadmap Coordination Team: Felix Sefkow (DESY)

WP 1: Sandwich calorimeters with fully embedded Electronics – Main and forward calorimeters

Conveners: Adrian Irles (IFIC, adrian.irles@ific.uv.es), Frank Simon (KIT, frank.simon@kit.edu), Jim Brau (University of Oregon, jimbrau@uoregon.edu), Wataru Ootani (University of Tokyo, wataru@icepp.s.u-tokyo.ac.jp), Imad Laktineh (I2PI, imad.laktineh@in2p3.fr), Lucia Masetti (masetti@physik.uni-mainz.de)

WP 2: Liquified Noble Gas Calorimeters

Conveners: Martin Aleksa (CERN, martin.aleksa@cern.ch), Nicolas Morange (IJCLab, nicolas.morange@ijclab.in2p3.fr), Marc-Andre Pleier (mpleier@bnl.gov)

WP 3: Optical calorimeters: Scintillating based sampling and homogenous calorimeters

Conveners: Etiennette Auffray (CERN, etiennette.auffray@cern.ch), Macro Lucchini (University and INFN Milano-Bicocca, marco.toliman.lucchini@cern.ch), Philipp Roloff (CERN, philipp.roloff@cern.ch), Sarah Eno (University of Maryland, eno@umd.edu), Hwidong Yoo (Yonsei University, hdyoo@cern.ch)

WP 4: Electronics and DAQ

Christophe de la Taille (OMEGA, taille@in2p3.fr)

Transversal Activitiies

Photodetectors: Alberto Gola (FBK, gola@fbk.eu)

The roadmap document(s)

- ECFA R&D Roadmap
  - CERN-ESU-017 https://cds.cern.ch/record/2784893
  - 248 pages full text and 8 page synopsis

- Endorsed by ECFA and presented to CERN Council in December 2021

The Roadmap has identified
  - General Strategic Recommendations (GSR)
  - Detector R&D Themes (DRDT)
  - Concrete R&D Tasks

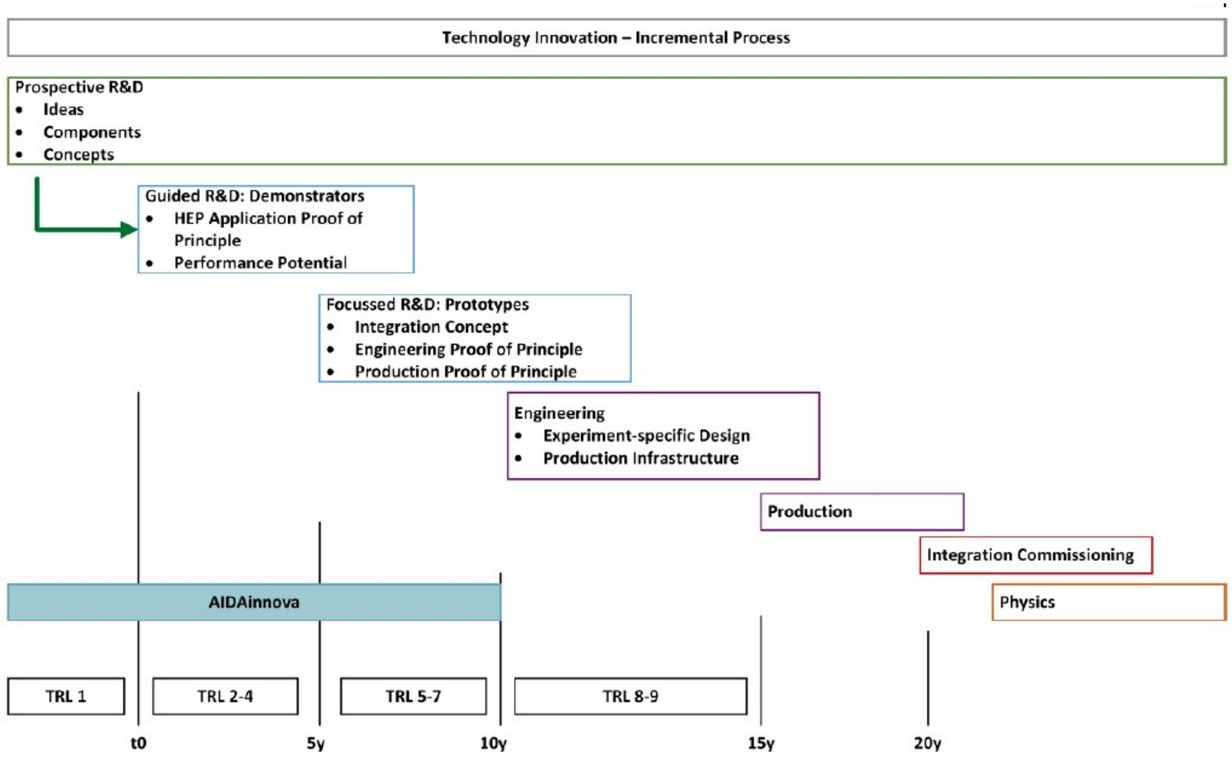
- Timescale of projects as approved by European Lab Director Group (LDG)

Guiding principle: Project realisation must not be delayed by detectors

Categories of R&D

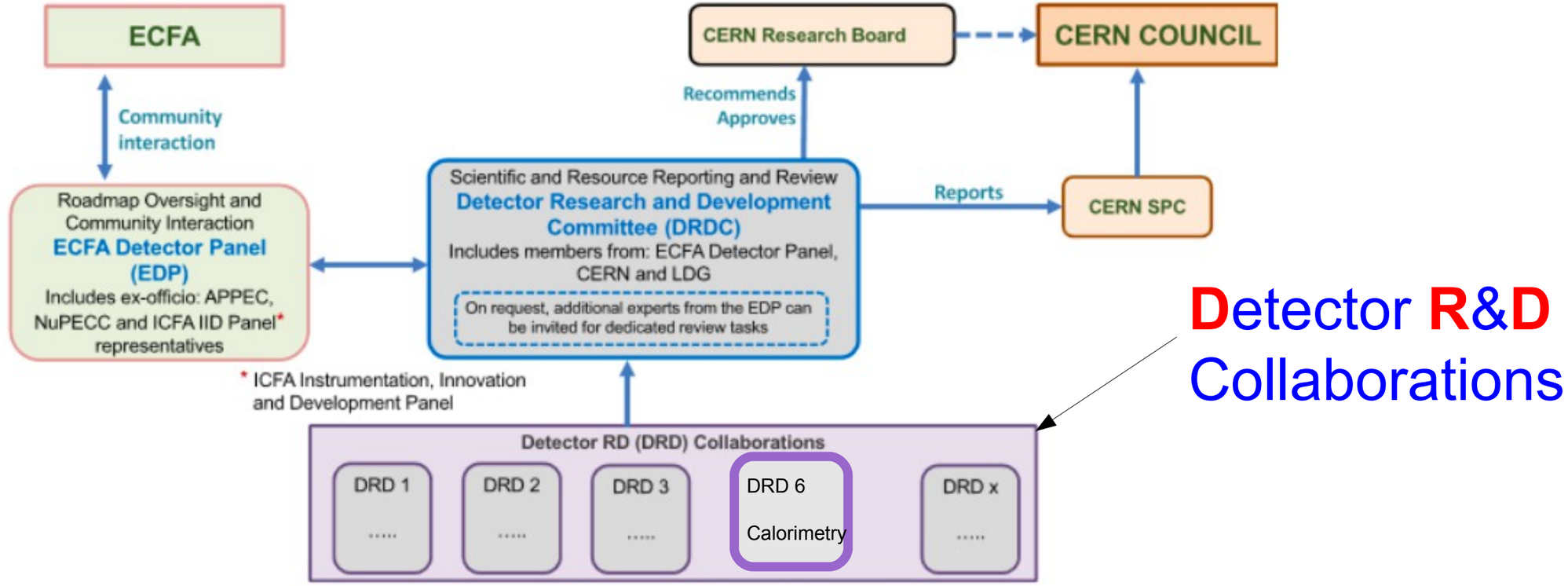
1. Strategic R&D via DRD Collaborations **vision**
   (long-term strategic R&D lines)
   (address the high-priority items defined in the Roadmap via the DRDTs)
2. Experiment-specific R&D **focus**
   (with very well defined detector specifications)
   (funded outside of DRD programme, via experiments, usually not yet covered within the projected budgets for the final deliverables)
3. "Blue-sky" R&D **agility**
   (competitive, short-term responsive grants, nationally organised)

Transitions Blue-sky → Strategic → Specific expected
Cross-fertilisation desired



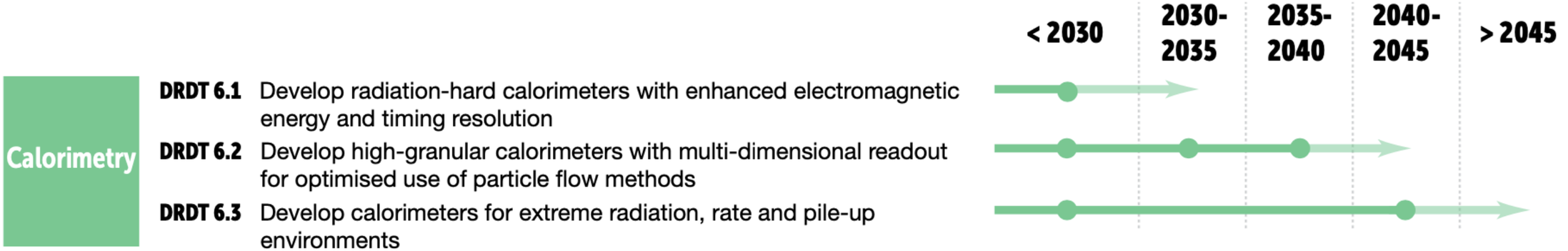
F. Sefkow, CALICE Meeting and ECFA Higgs/top/EW Factory Meeting

Future Organisation of Detector R&D (in Europe)



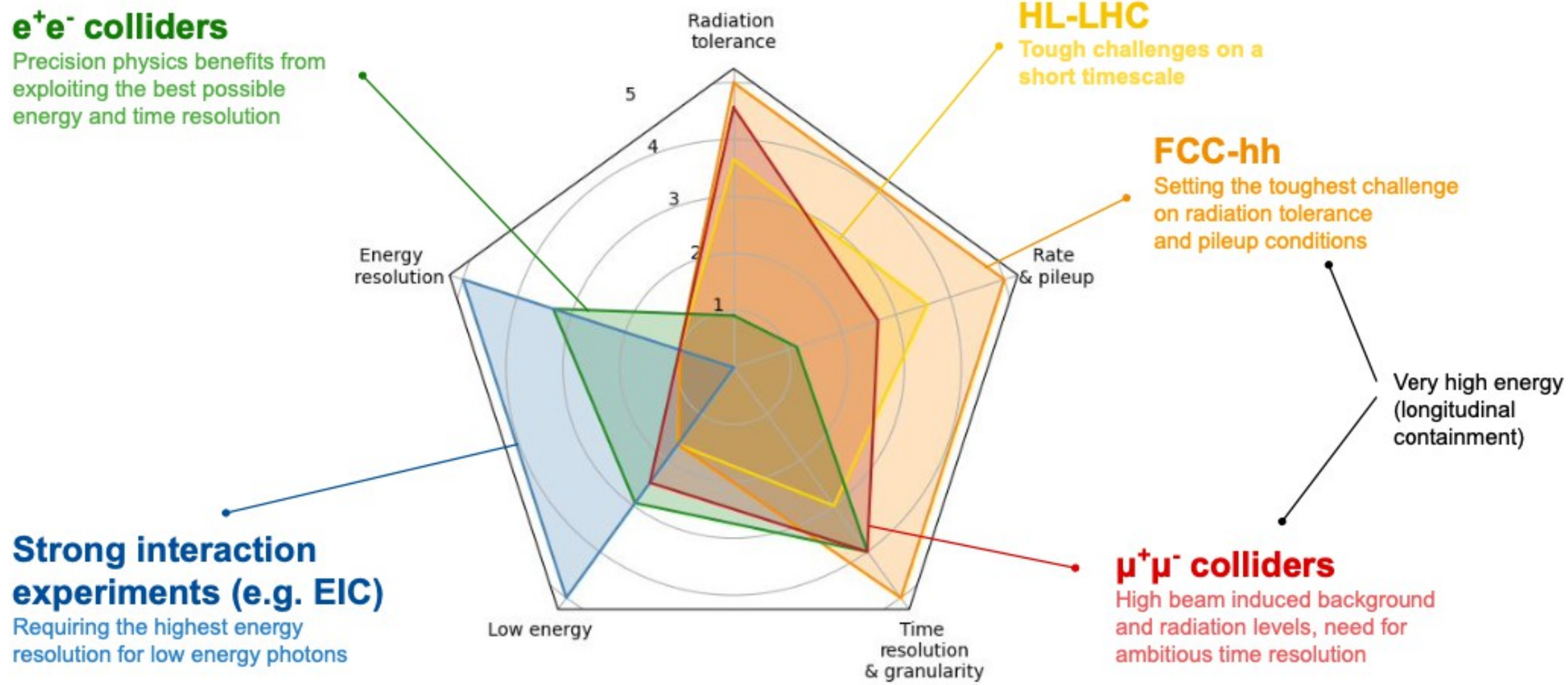
- DRD will be hosted by CERN and therefore become legally CERN collaborations
  - Significant participations by non-European groups is explicitly welcome and needed => World wide collaborations!
- The progress and the R&D will be overseen by a DRDC that is assisted by ECFA
  - Thomas Bergauer of ÖAW/Austria appointed as DRDC-Chair
- The funding will come from national resources (plus eventually supranational projects)

Future Facilities and DRDT for Calorimetry



- The **D**etector **R**&**D** **T**hemes and the provisional time scale of facilities set high-level boundary conditions
  - See backup slides for detailed R&D tasks

Requirements for calorimetry at future colliders



Inspired from https://indico.cern.ch/event/994685/

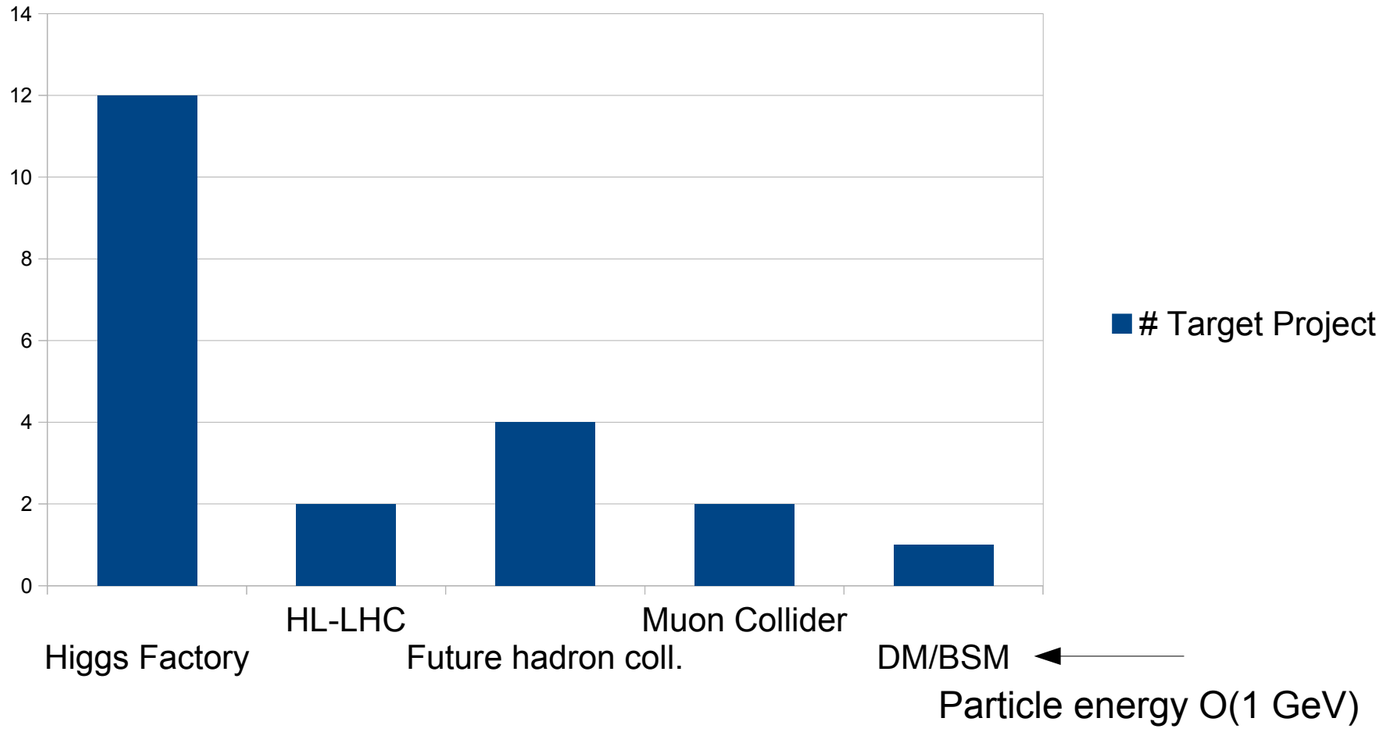
Calorimetry - “Current Ecosystem”

- Proposals comes from pre-existing collaborations or working framework
- Consolidated modus-operandi and experience
- Need to pick up all the best and put into the DRD6 collaboration

Implementation of DRD Calorimetry

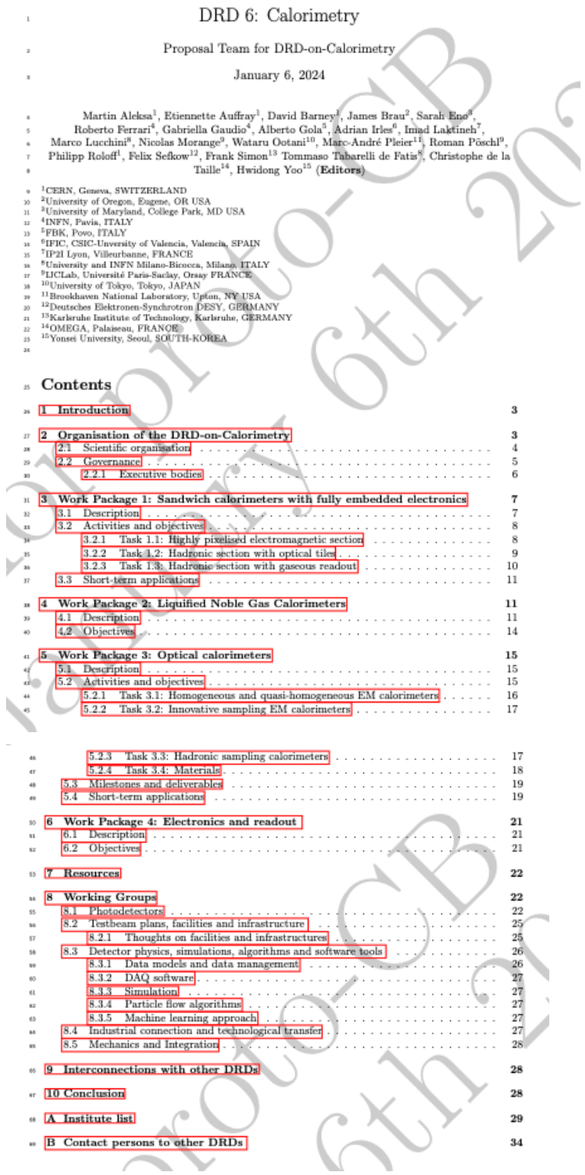
- **Entry point, "DRD Calo indico page": https://indico.cern.ch/category/12772/**
  - 234 people from four regions registered
  - Indico page now retired
- 1st Community Meeting 12/1/23
  - https://indico.cern.ch/event/1212696/
- Proposal phase until 15th of November 2023
  - **Input proposals collected until 1st of April 2023**
  - 2nd Community Meeting 20th April 2023
    - https://indico.cern.ch/event/1246381/
  - Input proposals have been condensed into a DRD-on-Calorimetry proposal
    - Final version submitted to DRDC on November 15th
- **DRD-on-Calorimetry approved by CERN Research Board on December 6th 2023 to start on January 1st 2024**

DRD Calo - Input proposals and target projects



- Higgs factories dominate
  - HF includes heavy flavour that target superb elm. energy resolutions
- (Already now) orientation towards future hadron collider and muon collider

On the DRD Calo proposal ...



DRD 6: Calorimetry

Proposal Team for DRD-on-Calorimetry

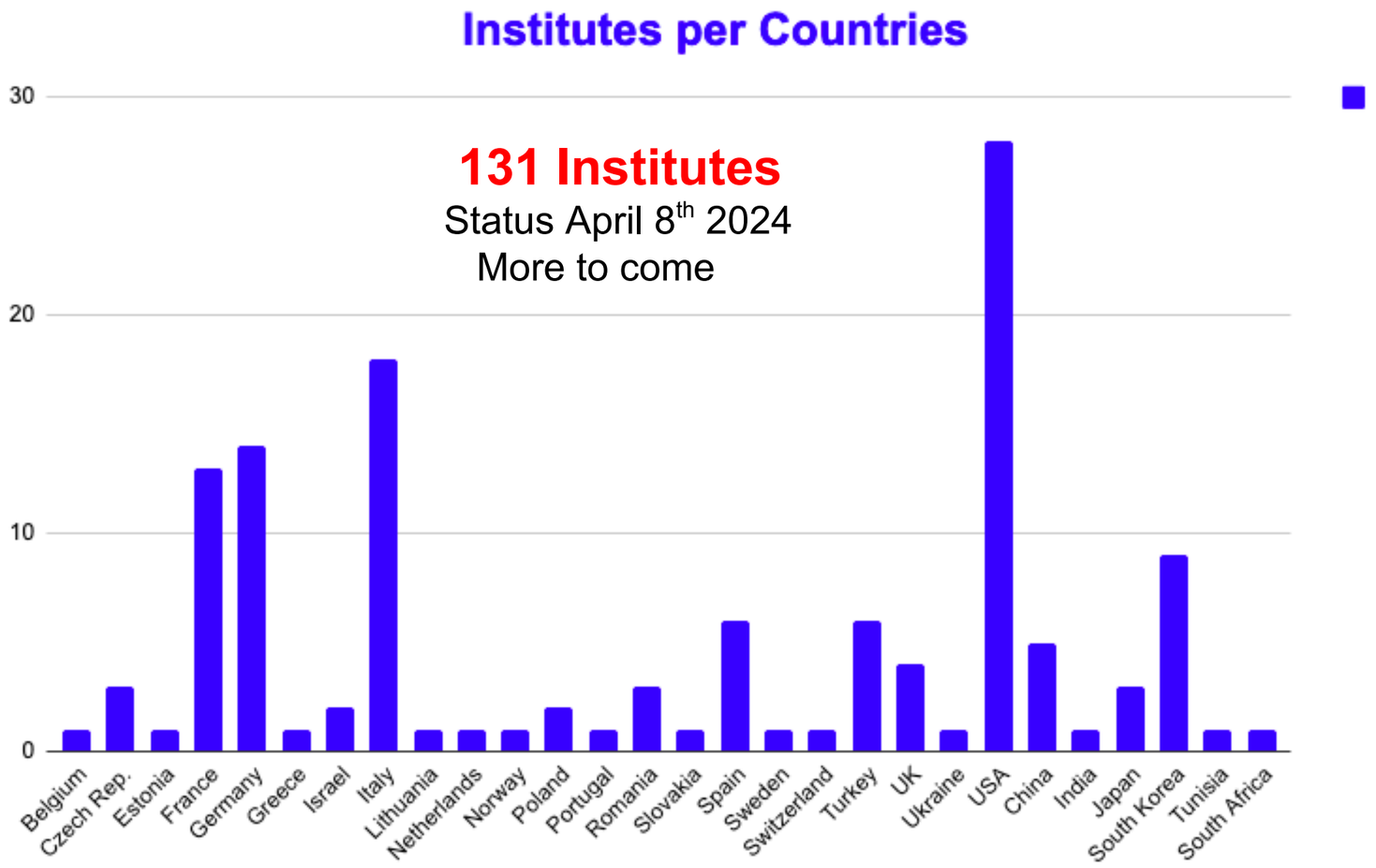
January 6, 2024

Martin Aleksa[1], Etiennette Auffray[1], David Barney[1], James Brau[2], Sarah Eno[3], Roberto Ferrari[4], Gabriella Gaudio[4], Alberto Gola[5], Adrian Irles[6], Imad Laktineh[7], Marco Lucchini[8], Nicolas Morange[9], Wataru Ootani[10], Marc-André Pleier[11], Roman Pöschl[9], Philipp Roloff[1], Felix Sefkow[12], Frank Simon[13] Tommaso Tabarelli de Fatis[8], Christophe de la Taille[14], Hwidong Yoo[15] (**Editors**)

[1]CERN, Geneva, SWITZERLAND
[2]University of Oregon, Eugene, OR USA
[3]University of Maryland, College Park, MD USA
[4]INFN, Pavia, ITALY
[5]FBK, Povo, ITALY
[6]IFIC, CSIC-University of Valencia, Valencia, SPAIN
[7]IP2I Lyon, Villeurbanne, FRANCE
[8]University and INFN Milano-Bicocca, Milano, ITALY
[9]LICLab, Université Paris-Saclay, Orsay FRANCE
[10]University of Tokyo, Tokyo, JAPAN
[11]Brookhaven National Laboratory, Upton, NY USA
[12]Deutsches Elektronen-Synchrotron DESY, GERMANY
[13]Karlsruhe Institute of Technology, Karlsruhe, GERMANY
[14]OMEGA, Palaiseau, FRANCE
[15]Yonsei University, Seoul, SOUTH-KOREA

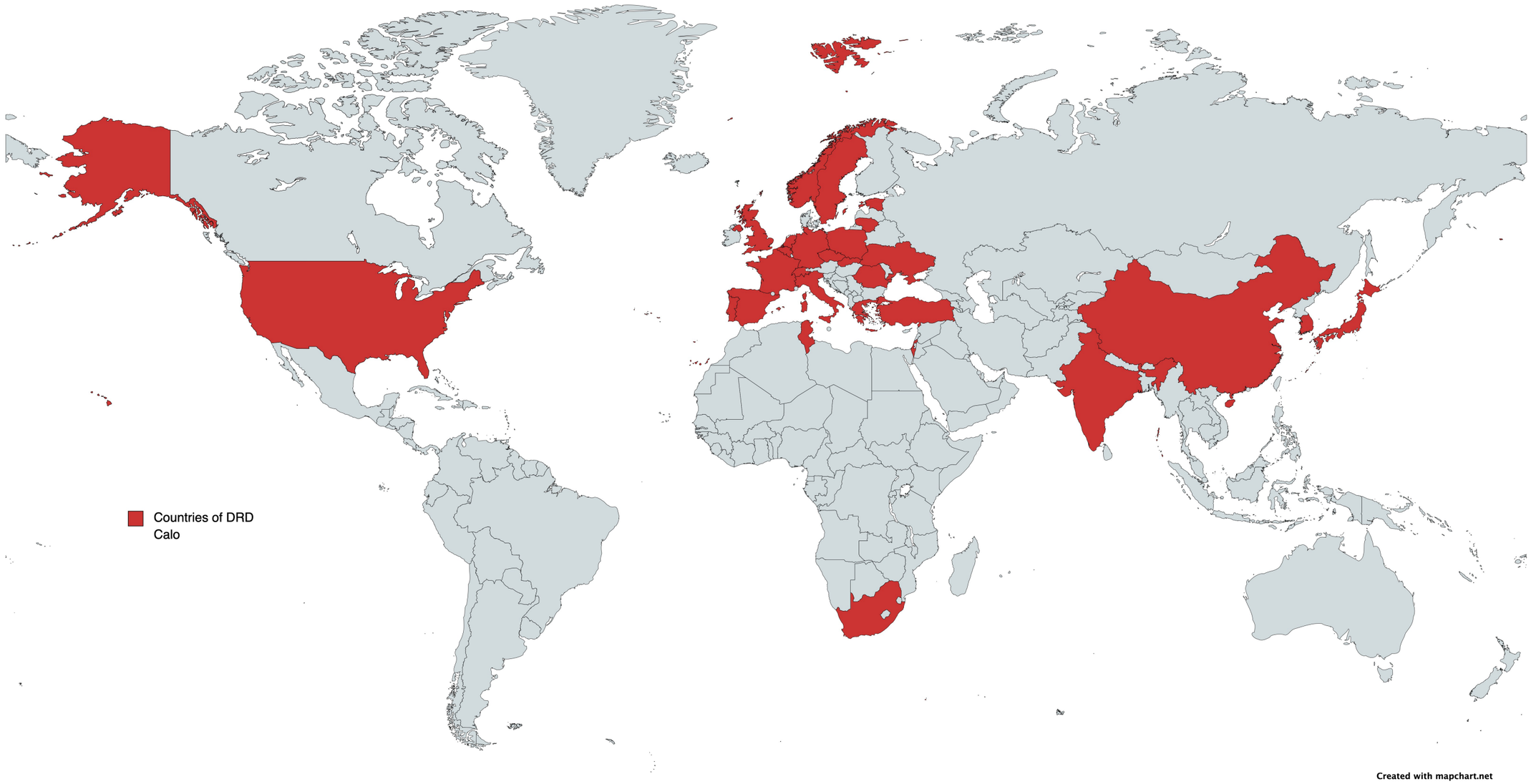
Contents

- 34 pages
  - Based on worldwide community input
- Short description of goals, projects and organisation
  - Research program (and resources) focuses on 2024 – 2026
  - ... and outlooks beyond
  - Introduction of
    - Proposal of initial Governance structure (see below)
    - Work Packages and Working Groups (see below)
- CERN-DRDC-2024-004 ; DRDC-P-DRD6: http://cds.cern.ch/record/2886494



- Counted are groups that have expressed an interest to join the DRD Calo via the input proposals or in communication afterwards
- **Representatives of these groups form the proto-Collaboration Board (proto-CB)**

DRD Calo – Where are we?



DRD Calo – Overall goals

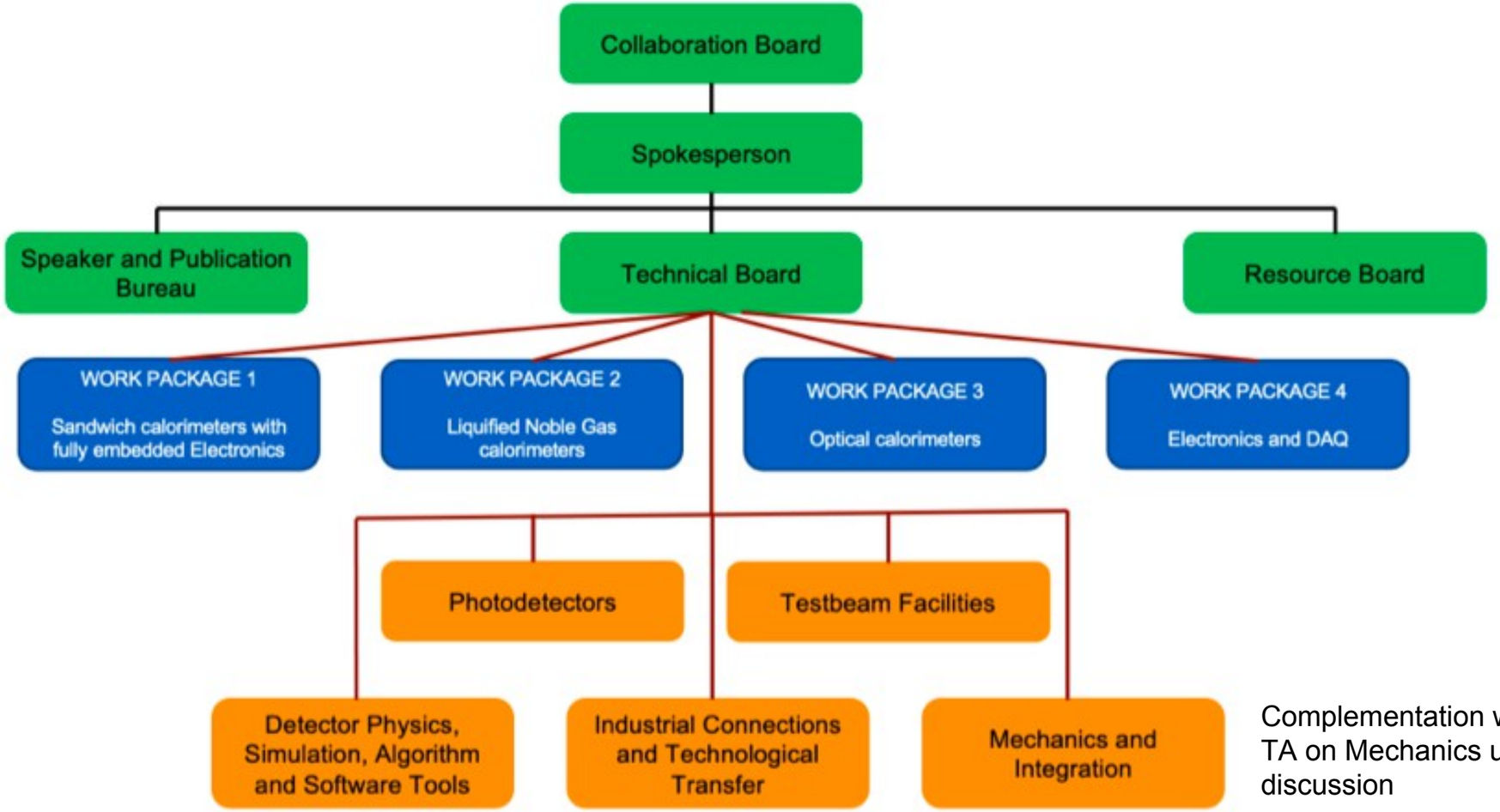
- DRD should deliver informed input to technological decisions of future facilities (of all sizes)
- All proposals should reach the same level of maturity
- Openness to new ideas
- Collaboration structure should reflect these goals
- Research Programs of Work Packages and Working Groups will be at the heart of the collaboration
  - Work Package 1: Sandwich calorimeters with fully embedded Electronics – Main and forward calorimeters
  - Work Package 2: Liquified Noble Gas Calorimeters
  - Work Package 3: Optical calorimeters: Scintillating based sampling and homogenous calorimeters
  - Work Package 4: Electronics and DAQ
  - The Work Packages are complemented by a set of Working Groups that help to ensure the overall coherence of the scientific program

DRD Calo – Basic structure

MANAGEMENT:

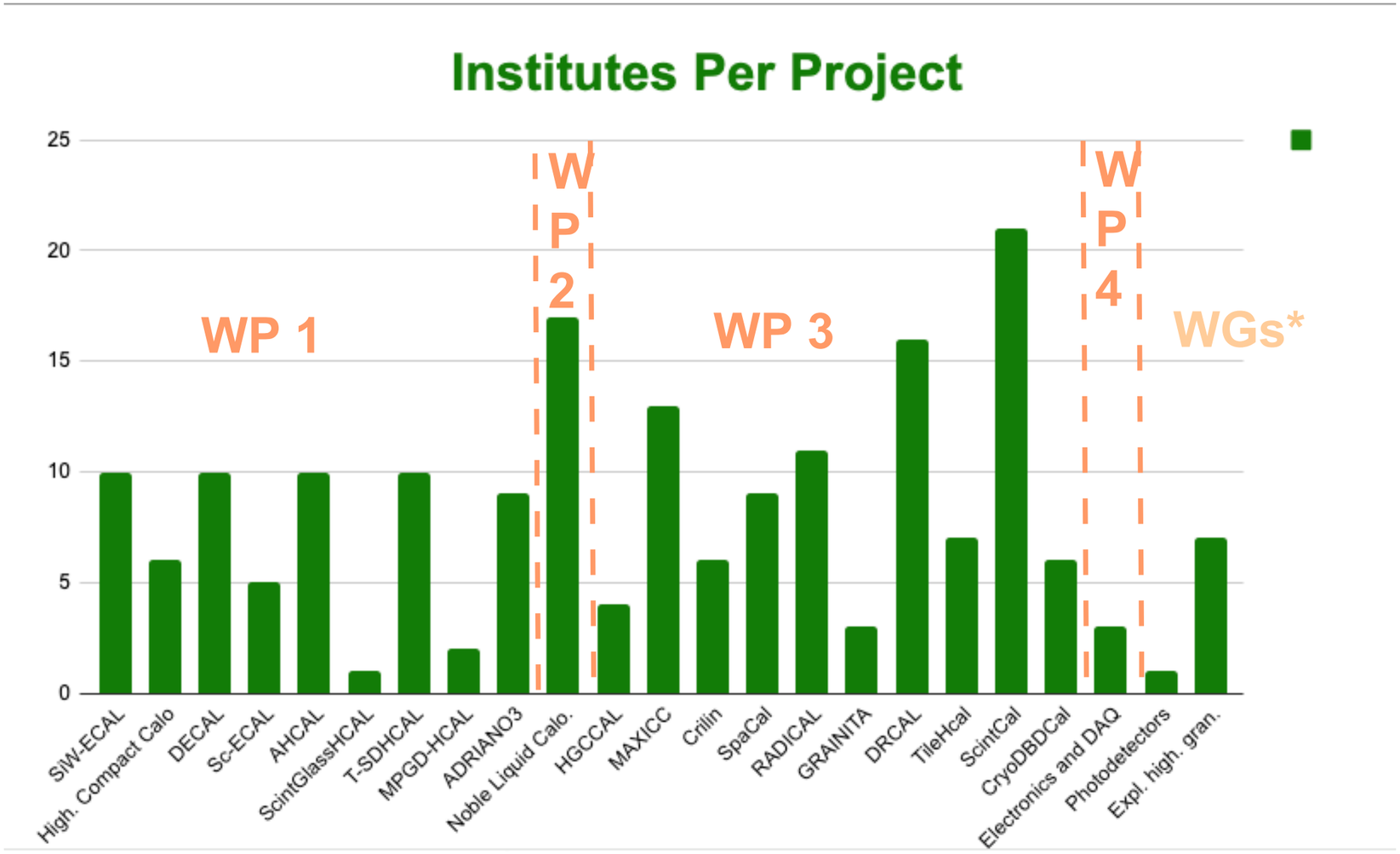
WORK PACKAGES:

WORKING GROUPS:



Complementation with TA on Mechanics under discussion

DRD Calo – Institutes and Work Packages (Working Groups)



*Listing those for which a clear association could be made

T. Bergauer, 113th Plenary ECFA Meeting, Nov. 2023

Memorandum of Understanding

- All institutes of one DRD collaboration sign a "light-weight" MoU
  - Does not contain commitments on strategic funds
  - Defines Common Fund, if agreed by the respective DRD Collaboration
  - Covers IP topics, how to handle involvement of industr

  (In that case very similar as the current existing MoUs of RD50/51)
  - MoU Template will be provided by CERN (currently being negotiated with legal office, KT, DRC,..)
- Strategic funding will be agreed upon in annexes to this light-weight MoU
  - One Annex per Work Package, signed by the FAs of the institutes involved in the respective WP

- Active discussions on MOU with DRDC and CERN Management
- More in talks by Thomas and Roberto

Setting up the DRD-on-Calorimetry – First actions

- 10th of January 2024
  1st proto-Collaboration Board Meeting = First event of new DRD-on-Calorimetry Collaboration
  - 92 groups registered
  - Recap of way until approval of DRD
  - Outline and discussion of “way ahead”
  - First steps to implement the Collaboration and their endorsement
    - Bootstrap procedure
    - Initial Collaboration structure
    - Preparation of CB-Chair election

- Election of Collaboration Board Chair
  - Meeting on CB Election on February 22nd
  - Roberto Ferrari (INFN Pavia) elected on March 6th

- Preparation of Spokesperson Election
  - Call for proposals until April 4th
  - Candidate presentation today
  - Election after Collaboration Meeting

DRD-on-Calorimetry – Communication

- In general we will use CERN e-groups as main communication channel

- Tree structure for general DRD Calo e-group
  - This means that **each institute** creates and maintains its own e-group
  - drdcalo-cern, drdcalo-pavia, drdcalo-ijclab, drdcalo-desy, ...
  - Only these e-groups will be included into the general e-group drdcalo-general@cern.ch
    - drdcalo-general exists since 22/2/24
    - Remark: It will take some time until all institutes have created their e-group
      - Until this happens the corresponding group leader will be explicitly part of drdcalo-general@cern.ch and will be responsible for propagating relevant information to his/her group
      - As soon as the e-group is created the group leader will be removed from the general e-group
      - As of today 30 institute e-groups exist, further reminders will be sent regularly to the Collaboration Board

- We need a web page ...

- We need a logo (and another name?)

- Indico page: https://indico.cern.ch/event/1368231/
  - 130 registered participants, 67 on-site partially from far away

- Support by Patricia Mage-Granados and Caroline Cazenoves, Thank you very much!!!!!

- Sessions and Rooms
  - April 9th: CERN Council Chamber for plenaries
  - April 10th: CERN Council Chamber, Salle Dirac, Filtration Plan for parallels
    - Parallels on WP 1-3 in morning and early afternoon (see agenda)
    - Two parallel sessions for Software (Council) and Beamtest WG (Filtration Plant) including discussion/brainstorming on how to set them up
  - April 11th: CERN Council Chamber for plenaries
  - Room B as office space that might be also used for ad-hoc meetings

- Social events
  - Dinner on Wednesday 10th of April at CERN, area outside of Glassbox in R1
  - Coffee breaks
    - Delivery Pas Perdus on 9th and 11th
    - 5 CHF vouchers on April 10th

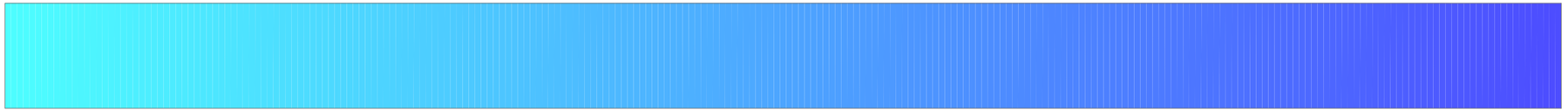
Conclusions

- DRD-on-Calorimetry will pursue strategic R&D for calorimeters for future colliders
  - Partially new efforts, partially capitalising on existing activities
- Scientific programme and first ideas of Collaboration structure have been worked out by Proposal Team in collaboration with community
- Approval by CERN Research Board to start Collaboration on January 1st 2024
- Now progressive move from Proposal Team to full collaboration structure
- This meeting kicks off the collaboration and the scientific programme

Welcome to the meeting
(and be there for the Group Photo at 15.30h)

Backup

Ramp up of activities – Rough View



- Input proposals reveal little (extra) need at the beginning (2024-2026)
  - Start with prototypes that are either existing or currently under construction
  - (Mainly) benefitting from existing funding at national or international level (i.e. AIDAinnova, EUROLABS in Europe or CalVision, RADICAL in the US [plus maybe others])
  - Specification studies, concept proof – would require fresh funding
- Relatively high density of beam tests with new (large scale) prototypes after 2026
  - Several large-scale prototypes demonstrate ambition of R&D programme
- Execution of program requires availability and support of beam test facilities

Calorimetry- Identified Key Technologies and R&D Tasks

DRD Calo

- Key technologies and requirements are identified in ECFA Roadmap
  - Si based Calorimeters
  - Noble Liquid Calorimeters
  - Calorimeters based on gas detectors
  - Scintillating tiles and strips
  - Crystal based high-resolution Ecals
  - Fibre based dual readout
- R&D should in particular enable
  - Precision timing
  - Radiation hardness
- R&D Tasks are grouped into
  - Must happen
  - Important
  - Desirable
  - Already met