

Workpackage 8 - Calorimetry and Particle ID Detectors

Katja Krüger



Roman Pöschl



Roberto Ferrari



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004761.

Task 8.1. Coordination and Communication (15 kEUR)

- Management and coordination of the Work Package, including monitoring of work progress, budget spending and reporting to the project management.
- Organisation of WP meetings as well as meetings with other WPs and coordinating presentation of results within AIDAInnova and to the detector community.

Task 8.2. Towards next generation highly granular calorimeters (356 kEUR)

- Development of a common electromagnetic and hadronic calorimeter data concentration interface for minimised space and power consumption
- Demonstrator with functional active detector elements and full read-out chain
- Development of a high granularity demonstrator for Liquid Noble gas calorimeters with innovative readout technologies

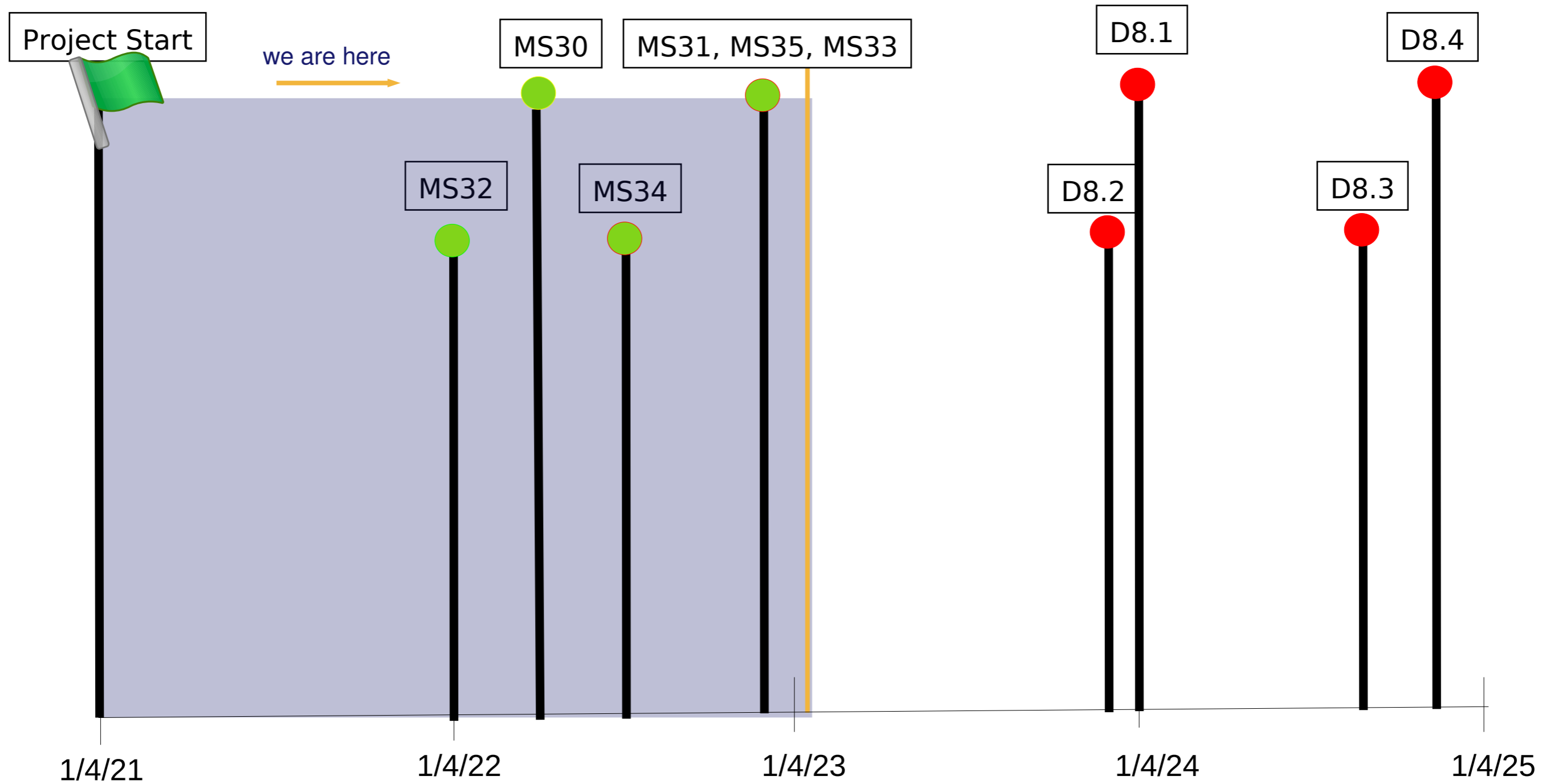
Task 8.3. Innovative calorimeters with optical readout (300 kEUR)

- Optimisation of crystal materials and processes for fast timing applications in radiation environments
- Industrialisation of the production process of fast and radiation-hard crystals
- Study of neutron detection with organic scintillators
- Develop scalable production procedures for large-scale highly granular scintillator calorimeters

Task 8.4. Innovative solid-state light sensors and highly-granular dual-readout fibre-sampling calorimetry (369 kEUR)

- Systematic study of neutron irradiated SiPMs at different temperatures
- Development of SiPMs with improved radiation resistance
- Definition of the specifications for an optimal ASIC and the readout for fibre-sampling dual-readout calorimeters
- Construction of several 10×10 cm², 2 m long, dual-readout matrices with SiPM sensors and readout electronics

WP8 - Timeline



Summary – WP8 Milestones

#MS	Description	Task	Due	Type	Lead
MS30	Conceptual design and technical specifications of DAQ interfaces for highly granular electromagnetic and hadronic calorimeters	8.2.1	M15 → M18	Report to StCom	DESY
MS31	Design and simulation of LAr readout electrode	8.2.2	M23	Report to StCom	CUNI
MS32	Test benches for testing detecting materials in picosecond and sub-picosecond domains.	8.3.1	M12	Specs data sheet	CERN
MS33	Design and test of scintillating tiles or strips with large active area suitable for large area detectors	8.3.2	M15 → M23	Operational Testbenches	MPG-MPP
MS34	Definition of SiPM requirements and performance studies with simulations of different use cases	8.4.1	M18 → M21	Report to StCom	JSI
MS35	Definition of the assembly method and of the ASIC specifications for a dual-readout calorimeter	8.4.2	M23	Report to StCom	INFN-MI

- **Task 8.1**
 - Today's Face-to-Face Meeting
- **Task 8.2**
 - Task 8.2.1: MS30 report, submitted on M18 (due on M15)
 - Task 8.2.2 (obligations completed): MS31 report
- **Task 8.3**
 - Task 8.3.1: MS31 specification data sheets
 - Task 8.3.2 (obligations completed):
 - MS33 delay from M15 → M23 due to lack of matching funds for some groups
- **Task 8.4**
 - Task 8.4.1: MS34 report, submitted on M21 (due at M18)
 - Task 8.4.2: MS35 report, submitted on M23

	Description	Task	Lead	Type	Dissemination	Due
D8.1	Demonstrator of a combined read-out system of highly granular electromagnetic and hadronic calorimeters	8.2	DESY	DEM	PU	M36
D8.2	Report on prototypes construction, performance and assessment of industrialisation	8.3	CERN	R	PU	M35
D8.3	Qualification of neutron irradiated SiPMs at different temperatures	8.4	JSI	R	PU	M44
D8.4	Construction and qualification with beam of 10×10 cm ² , 2 m long, prototypes	8.4	INFN-MI	DEM	PU	M46



Grant Agreement No: 101004761

AIDainnova

Advancement and Innovation for Detectors at Accelerators
Horizon 2020 Research Infrastructures project AIDAINNOVA

PERIODIC TECHNICAL REPORT

AIDAINNOVA: 1ST PERIODIC REPORT UPDATE TO COVER PERIOD 1 (1.4.2021- 30.09.2022)

Work package: WP8: Calorimeters and Particle Identification Detectors

Lead beneficiary: CERN

Period covered by the report: from 1 April 2021 to 30 September 2022
Periodic report: Period 1

Instructions are highlighted in green

Text highlighted in yellow: what already published in Year 1 report

In bold: where you should add new information, if relevant

Delivery Slip

	Name	Partner	Date
Authored by	V. Boudry	CNRS-LLR	30/10/22
	J. Faltova	CUNI	
	E. Auffray Hillemanns	CERN	
	F. Simon	MPP-MPG	
	R. Pestotnik	JSI	
	R. Santoro	INFN-MI	
Edited by	R. Poschl	CNRS-IJCLab	04/11/22
	K. Krüger	DESY	
	R. Ferrari	INFN-Pavia	
Reviewed by	I. Surname, I. Surname	[Short name]	dd/mm/yy
	I. Surname	[Short name]	
Approved by	Steering Committee		dd/mm/yy

- P1 Report

- Covers period April 2021 – September 2022 (18 months)

- Draft was due Oct 24 -> delivered on Nov 10

(could do better with delivering reports on time)

- Any publications (papers, conference proceedings, conference talks and posters, other communication) that benefit from AIDAinnova should acknowledge AIDAinnova with the following text:
 - “This project has received funding from the European Union’s Horizon 2020 Research and Innovation programme under GA no 101004761.”
 - > otherwise not eligible as AIDAinnova publication
- Upload publication to Zenodo portal and/or let us know
 - Details under: <https://aidainnova.web.cern.ch/publications>
- In principle WP Coordinators responsible of proper review of publications carrying AIDAinnova acknowledgement
 - Note that AIDAinnova offers review for publications not reviewed elsewhere
 - <https://aidainnova.web.cern.ch/results/publication-committee>

Frank Simon moved from MPG-MPP to KIT

- KIT not in AIDAinnova
- MPP WP8 group no longer exists
- task 8.3.2 obligations completed
(no budgetary consequences)

However, new task convenor needed (search in progress ...)

The Proposal Team

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

Track conveners:

Adrian Irlles (IFIC), Frank Simon (KIT), Jim Brau (U. of Oregon), Wataru Ootani (U. of Tokyo)

Track 2: Liquified Noble Gas Calorimeters

Track Conveners:

Martin Aleksa (CERN), Nicolas Morange (IJCLab), Marc-André Pleier (BNL)

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

Track Conveners:

Etiennette Auffray (CERN), Gabriella Gaudio (INFN-Pavia), Macro Lucchini (U. and INFN Milano-Bicocca), Philipp Roloff (CERN), Sarah Eno (U. of Maryland), Hwidong Yoo (Yonsei Univ.)

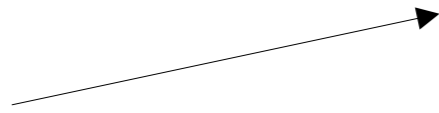
Track 4: Transversal Activities

Christophe de La Taille (Lab. Omega)

[Agenda link](#)

From Gabriella's Introduction

No obvious boundaries among Track 1 and Track 3



ECFA Proposal Submission Statistics

23 proposals received: track distribution

- track 1: 8 (10) proposals
- track 2: 1 proposal
- track 3: 12 (10) proposals
- track 4: 2 proposals

23 proposals received: geographical distribution

- 25 countries
- 4 geographical areas
 - Europe: 19 countries
 - Africa: 1 country
 - America: 1 country
 - Asia: 4 countries

Calo type(*)

- ECAL: 11
- HCAL: 7
- BOTH: 4

Calo type (**)

- Homogeneous: 5
- Sampling: 13
- BOTH: 4

(*) Doesn't apply to Cryogenic DBD proposal
 (**) Doesn't apply to Common ASIC proposal

MUCOLL
CALICE
CERN FCC-ee
ALICE-FOCAL
Korea NRF GRANT
CrystalClear
CalVision LHC FCC-LH
AIDA innova LUXE
MODE
GlassScint
EUROLABS
Radical

- 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

Calorimeters no longer measure only Energy (1D → 5D)

Timescale not always clear in the proposals

Beam line and instrumentation for testing ***** CRITICAL *****
→ link to Roman's [Talk](#)

Many common issues/sinergies:

software/algorithms (PFA) → link to Gabriella's [Talk](#)

Geant4 simulation

DNN

T/DAQ and online monitoring → EUDAQ ?

Photodetectors and FE elx (ASICs) → link to Christophe's [Talk](#)

Link to Roman's final Talk

Possible guiding principles:

- a) clarify/understand Transversal Activities
- b) clarify/understand relation with other DRDs
- c) identify monitorable items (build proposal around “deliverables”)
- d) aim at flexible, light MoU
- e) leave details (funding, ...) in Addenda

Possible timing:

Draft proposal until beginning of June (2nd draft middle of June)

Submission at beginning of July

Summer/Early Autumn: feedback implementation + consolidation (3rd Community Meeting?)

January 2024: Calorimetry DRD in place

Yet a very positive impression from the meeting (very positive attitude of all participants)

Concern 1: not all is clear, in particular about funding mechanism

Concern 2: not all is clear about the “Proposal” meaning (NOT an MoU, NOT a formal commitment)

However the grounds look solid for building a successful collaboration!

Beneficiaries:

CAEN (Industry)
CERN
CNRS-IJCLab, CNRS-LLR, CNRS-LPNHE
CUNI
DESY
FBK (“Interface to industry”)
FZU
INFN-BO, INFN-LNF, INFN-PD, INFN-PG,
INFN-PV, INFN-TO
JSI
JGU
MPP-MPG
TAU
University of Bergen
University of Sussex
Vilnius University

Associated Partners:

FOTON (Industry)
GLASS2POWER (Industry)
Minsk
HZDR
Crytur