Optimisation and software tools
Common items

Roman Pöschl on behalf of the DRD Calo Proposal Team

ECFA R&D Panel Meeting – May 2023

DRD Calo – From input proposals to working structure

The Proposal Team

Track 1: Sandwich calorimeters with fully embedded Electronics – Main and forward calorimeters
Track conveners:
Adrian Irles (IFIC), **Frank Simon** (KIT), **Jim Brau** (U. of Oregon), **Wataru Ootani** (U. of Tokyo)

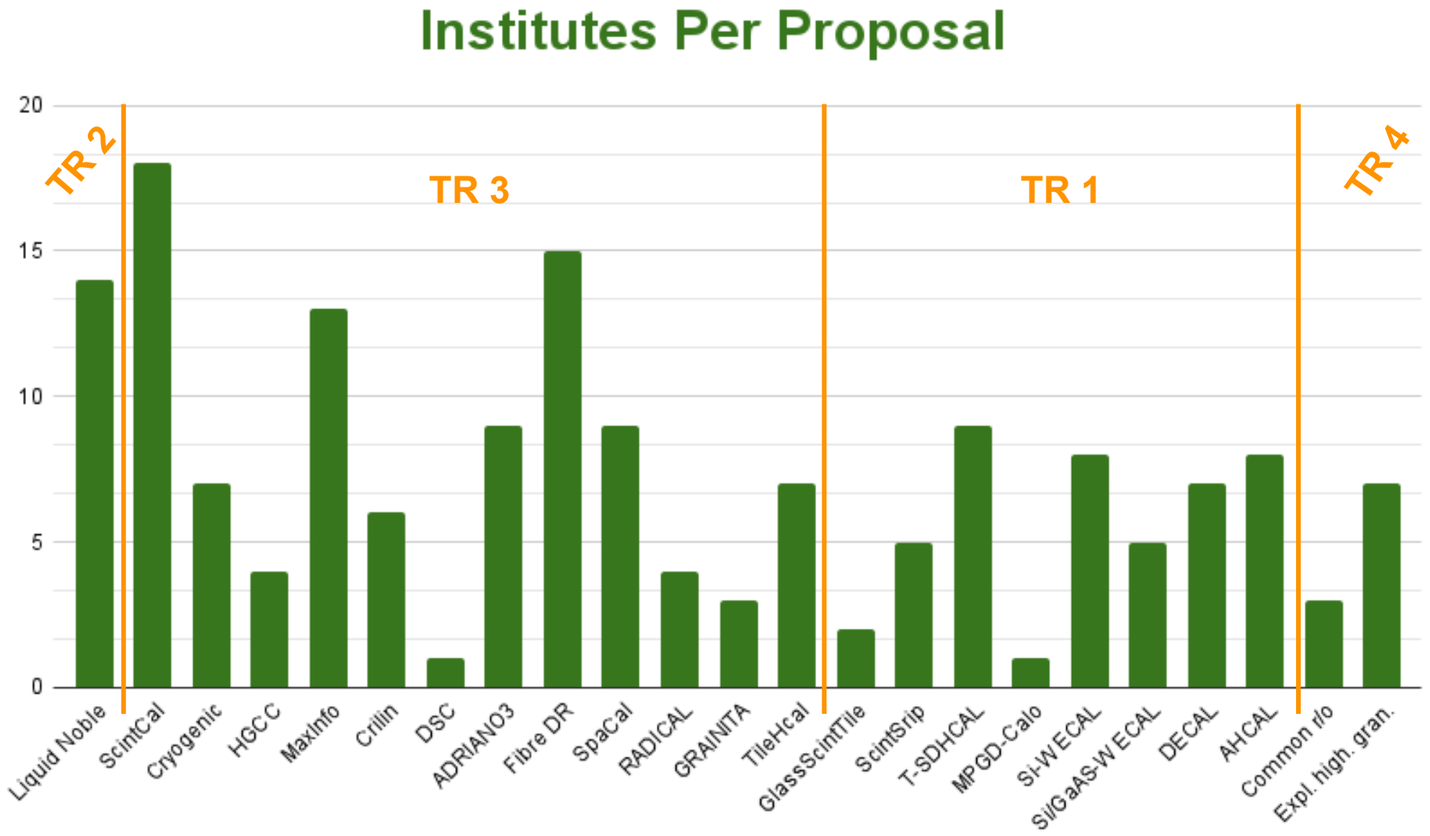
Track 2: Liquified Noble Gas Calorimeters
Track Conveners:
Martin Aleksa (CERN), **Nicolas Morange** (IJCLab), **Marc-André Pleier** (BNL)

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)

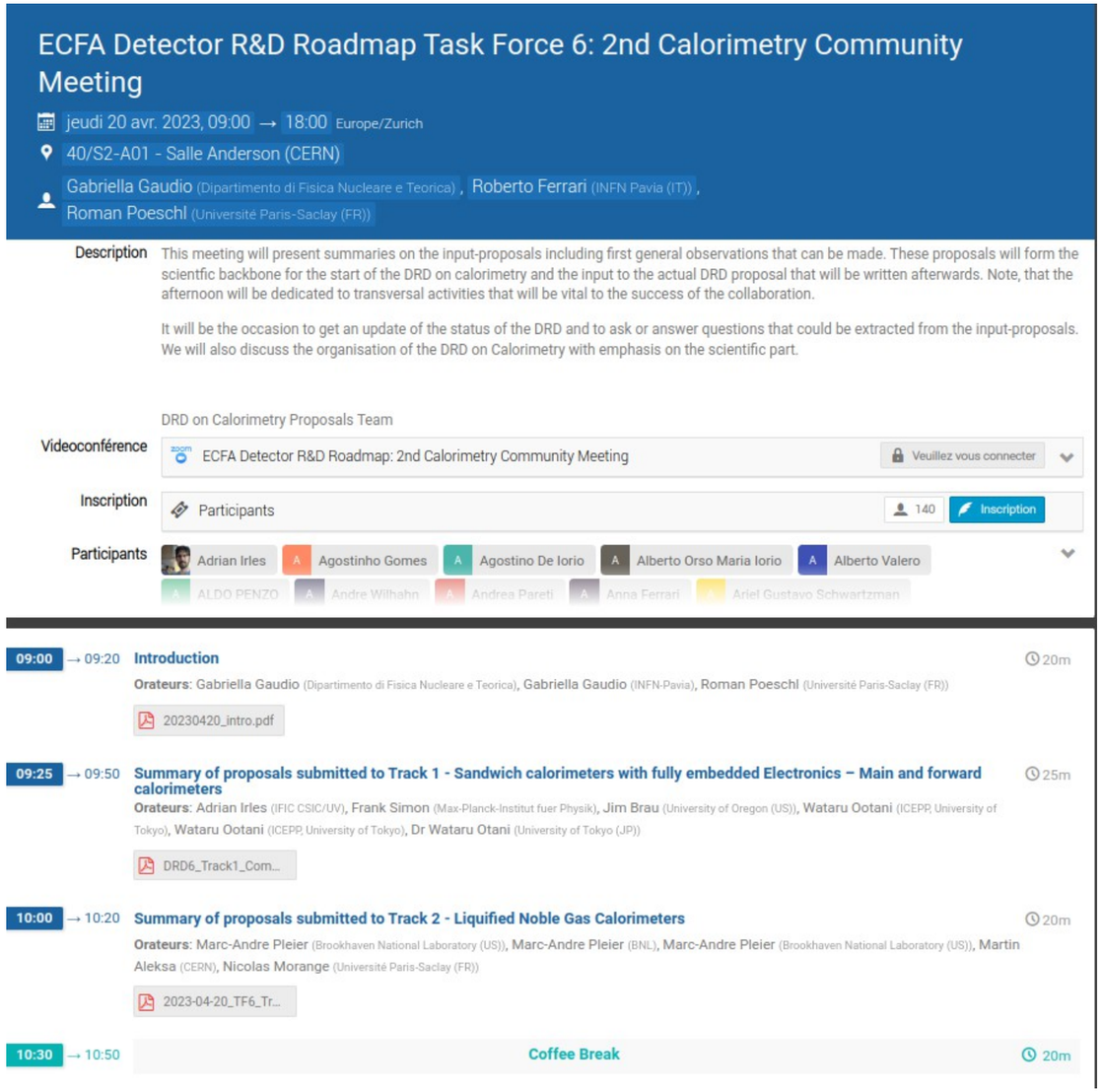
Input proposals

23 comprising 110 institutes/labs received



G. Gaudio
2nd Calorimeter Community Meeting

DRD Calo – 2nd Community Meeting 20th of April 2023



ECFA Detector R&D Roadmap Task Force 6: 2nd Calorimetry Community Meeting

jeudi 20 avr. 2023, 09:00 → 18:00 Europe/Zurich

40/S2-A01 - Salle Anderson (CERN)

Gabriella Gaudio (Dipartimento di Fisica Nucleare e Teorica) , Roberto Ferrari (INFN Pavia (IT)) , Roman Poeschl (Université Paris-Saclay (FR))

Description This meeting will present summaries on the input-proposals including first general observations that can be made. These proposals will form the scientific backbone for the start of the DRD on calorimetry and the input to the actual DRD proposal that will be written afterwards. Note, that the afternoon will be dedicated to transversal activities that will be vital to the success of the collaboration.

It will be the occasion to get an update of the status of the DRD and to ask or answer questions that could be extracted from the input-proposals. We will also discuss the organisation of the DRD on Calorimetry with emphasis on the scientific part.

DRD on Calorimetry Proposals Team

Videoconférence ECFA Detector R&D Roadmap: 2nd Calorimetry Community Meeting — Veuillez vous connecter

Inscription Participants — 140 — Inscription

Participants Adrian Irles, Agostinho Gomes, Agostino De Iorio, Alberto Orso Maria Iorio, Alberto Valero, ALDO PENZO, Andre Wilhahn, Andrea Pareti, Anna Ferrari, Ariel Gustavo Schwartzman

09:00 → 09:20 **Introduction** 20m

Orateurs: Gabriella Gaudio (Dipartimento di Fisica Nucleare e Teorica), Gabriella Gaudio (INFN-Pavia), Roman Poeschl (Université Paris-Saclay (FR))

20230420_intro.pdf

09:25 → 09:50 **Summary of proposals submitted to Track 1 - Sandwich calorimeters with fully embedded Electronics – Main and forward calorimeters** 25m

Orateurs: Adrian Irles (IFIC CSIC/UV), Frank Simon (Max-Planck-Institut fuer Physik), Jim Brau (University of Oregon (US)), Wataru Ootani (ICEPP, University of Tokyo), Wataru Ootani (ICEPP, University of Tokyo), Dr Wataru Otani (University of Tokyo (JP))

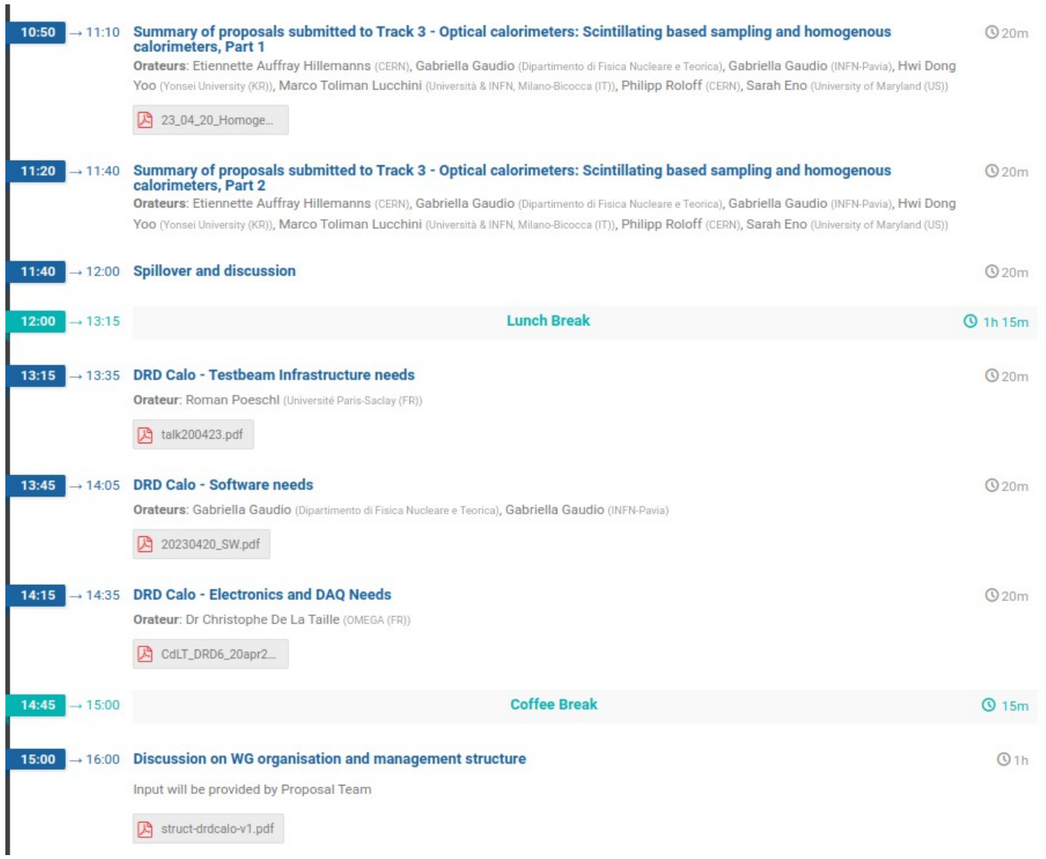
DRD6_Track1_Com...

10:00 → 10:20 **Summary of proposals submitted to Track 2 - Liquified Noble Gas Calorimeters** 20m

Orateurs: Marc-Andre Pleier (Brookhaven National Laboratory (US)), Marc-Andre Pleier (BNL), Marc-Andre Pleier (Brookhaven National Laboratory (US)), Martin Aleksa (CERN), Nicolas Morange (Université Paris-Saclay (FR))

2023-04-20_TF6_Tr...

10:30 → 10:50 **Coffee Break** 20m



10:50 → 11:10 **Summary of proposals submitted to Track 3 - Optical calorimeters: Scintillating based sampling and homogenous calorimeters, Part 1** 20m

Orateurs: Etiennette Auffray Hillemanns (CERN), Gabriella Gaudio (Dipartimento di Fisica Nucleare e Teorica), Gabriella Gaudio (INFN-Pavia), Hwi Dong Yoo (Yonsei University (KR)), Marco Toliman Lucchini (Università & INFN, Milano-Bicocca (IT)), Philipp Roloff (CERN), Sarah Eno (University of Maryland (US))

23_04_20_Homoge...

11:20 → 11:40 **Summary of proposals submitted to Track 3 - Optical calorimeters: Scintillating based sampling and homogenous calorimeters, Part 2** 20m

Orateurs: Etiennette Auffray Hillemanns (CERN), Gabriella Gaudio (Dipartimento di Fisica Nucleare e Teorica), Gabriella Gaudio (INFN-Pavia), Hwi Dong Yoo (Yonsei University (KR)), Marco Toliman Lucchini (Università & INFN, Milano-Bicocca (IT)), Philipp Roloff (CERN), Sarah Eno (University of Maryland (US))

11:40 → 12:00 **Spillover and discussion** 20m

12:00 → 13:15 **Lunch Break** 1h 15m

13:15 → 13:35 **DRD Calo - Testbeam Infrastructure needs** 20m

Orateur: Roman Poeschl (Université Paris-Saclay (FR))

talk200423.pdf

13:45 → 14:05 **DRD Calo - Software needs** 20m

Orateurs: Gabriella Gaudio (Dipartimento di Fisica Nucleare e Teorica), Gabriella Gaudio (INFN-Pavia)

20230420_SW.pdf

14:15 → 14:35 **DRD Calo - Electronics and DAQ Needs** 20m

Orateur: Dr Christophe De La Taille (OMEGA (FR))

CdLT_DRD6_20apr2...

14:45 → 15:00 **Coffee Break** 15m

15:00 → 16:00 **Discussion on WG organisation and management structure** 1h

Input will be provided by Proposal Team

struct-drdcalo-v1.pdf

- https://indico.cern.ch/event/1246381/
- 140 persons registered
  - compared with 139 at 1st Community Meeting
- First review of input proposals
  - ... and discussion on scientific program and structure of DRD Calo

DRD Calo – Basic structure

Management: Gouvernmental and executive bodies including Speakers Bureau (--> Dissemination)

Work Areas: Will deliver monitorable results and enable R&D with shared interest

- Technologies will emerge from input-proposals
  - Maybe after some minor regrouping

Full integrated sampling Calorimeters ~Track 1	Liquified Noble Gas Calorimeters ~Track 2	Optical Calorimeters ~Track 3
· Technology 1 · Technology 2 · ….		· Technology 1 · Technology 2 · ….

Transversal Activitites (common collaboration interests):

- Materials
- Photodetectors, Electronics and DAQ
- Testbeam Facilities snd Infrastructure
- Detector Physics, simulation, algorithms and s/w tools
- Industrial connection + technological transfer

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Transversal Activitites (common collaboration interests):

- Materials
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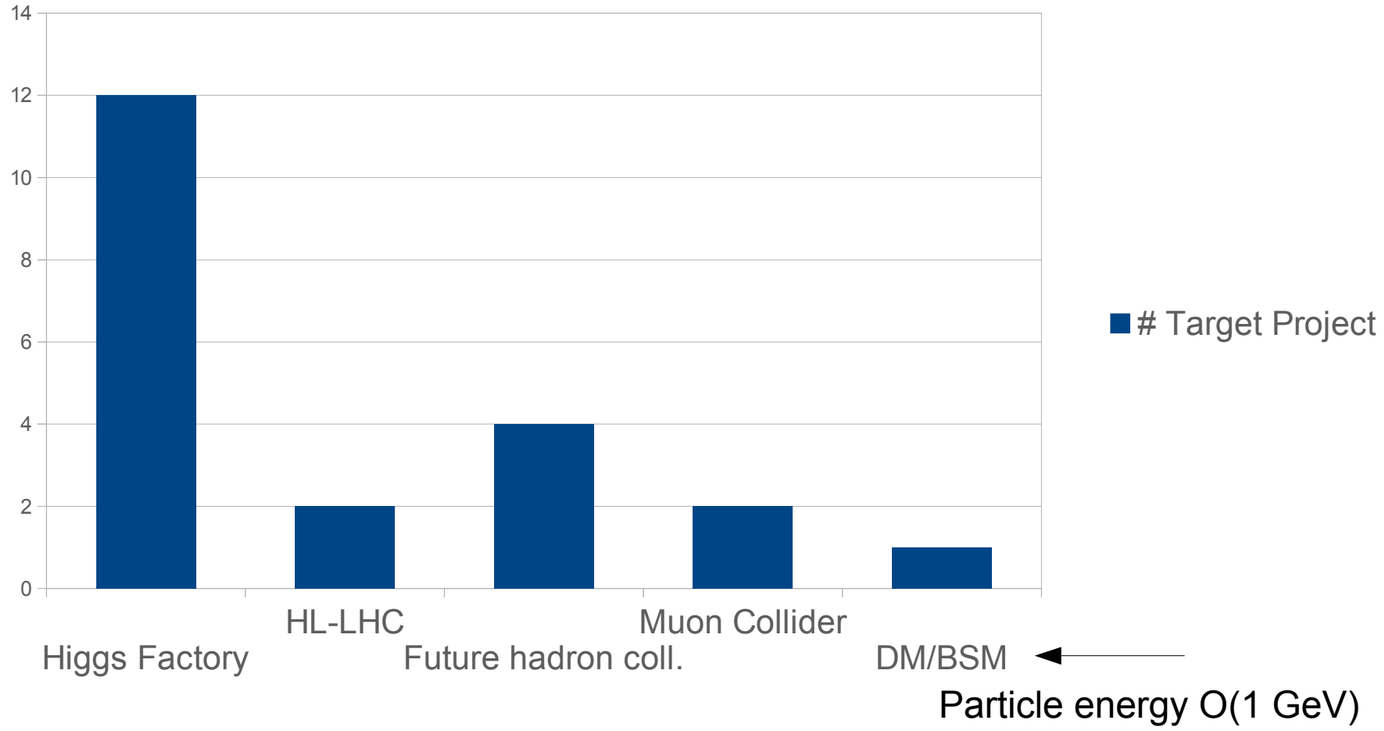
- Testbeam Facilities snd Infrastructure
- Detector Physics, simulation, algorithms and s/w tools
- Industrial connection + technological transfer

- Transversal Activities are vital for the success of the collaboration
- Transversal Activities will also ensure relations with other DRD

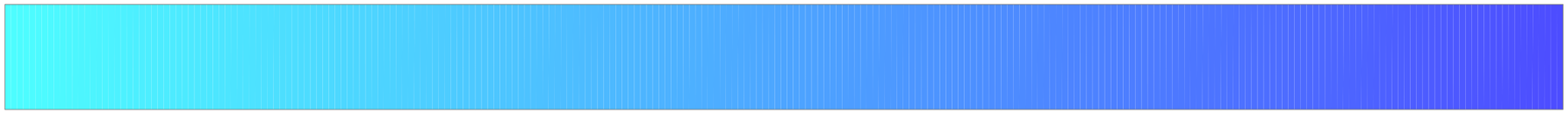
DRD Calo - Input proposals and beam tests

- 19 of 23 input proposals have declared that the devices are going to be tested in beam test (no surprise)
- (Main) target projects of input proposals (partially double counted, not mutually exclusive)



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

Input proposals - “Testbeam schedule”

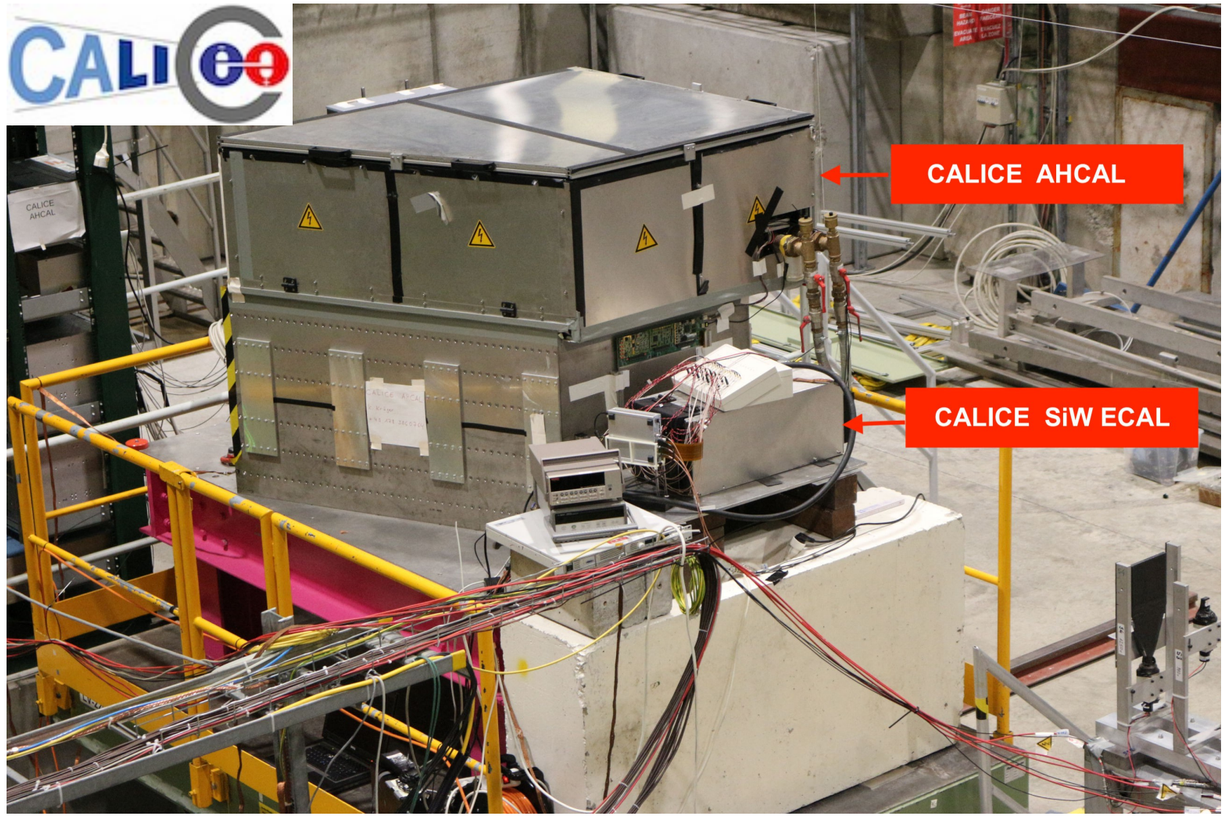


- Input-proposals reveal (relatively) little need at the beginning
  - Start with prototypes that are either existing or currently under construction
  - Benefitting from AIDAinnova and EUROLABS funding
- Relatively high density of beam tests with new (large scale) prototypes after 2025
- The large scale beam tests will be preceded by smaller scale beam tests
  - Smaller systems before “mass production”

Match Irradiation/Beamtest Facilities Detector Needs

	Energy	Irradiation
Higgs Factory CMS energy 90-1 TeV Radiation <= 10^{14} $n_{eq/}cm^2$	✓	✓
HL-LHC CMS energy 14 TeV (shared by partons) Radiation ~10^{16} n_{eq}/cm^2	(✓)	✓
Muon Collider CMS energy 3-10 TeV Radiation ~HL-LHC	x	✓
Future Hadron Collider CMS energy 100 TeV (shared by partons) Radiation up to ~10^{18} n_{eq}/cm^2	x	x

Dedicated Calorimeter Beamline?



Common setup at CERN June 2022

- Calorimeters are typically large objects
  - A beam test is similar to a small experiment
- Difficult for facility managers to schedule calorimeter beam tests
  - No concurring running with other devices possible
- Takes lots of expertise to carry out a successful beam test campaign
  - Implies use of infrastructure
- A dedicated beam line maybe with dedicated slots during a year may help curing these issues
  - Would need sustained expertise on the beamline

DRD Calo – Next steps

- The previous proposals set the boundary conditions for the drafting of the DRD Calo proposal
  - More intense review of input-proposals
  - Continuing discussion in proposal team
  - Exchange with submitters of input-proposals
    - **Scrutinisation of research program and indicated resources**

- Draft of DRD Proposal until beginning of June
  - Circulation among proposal team and submitters

- 2nd draft until middle of June
  - Presenting to higher level bodies?

- Beginning of July 2023 – Submission of DRD Calo proposal

Final scehdule most likely be off by 1/2 month

- Summer/Early Autumn
  - Implementation of feedback from proposal review
  - Detailed structure of work areas and transversal activities
  - Consolidation of organisation
    - Management structure
    - Including roadmap on assigning names to the different boxes
  - Understanding of which kind of documents do we need (MoU/MoA) and when
  - Maybe a 3rd Community Meeting

- 1st January 2024 – DRD on Calorimetry in place
  - Kick-off Meeting Spring 2024

Open questions

- Related to DRD Calo
  - We have received a proposal on “Cryogenic Double Beta Decays”
    - Implies Quantum Sensors and bolometers but the proposal is rather about the full system
  - Already discussions “behind the scenes” whether or not this proposal is well placed in DRD Calo
    - Different energy range => different target projects
  - If not in DRD Calo then where?

- General
  - DRD Proposal
    - Will there be a template to at least harmonise the format?