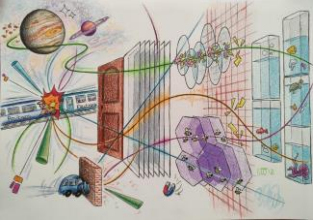


DRD3 update

Eva Vilella

University of Liverpool

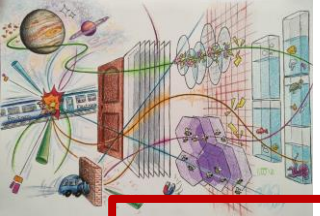


New 'Detector R&D' collaborations

- **2021 ECFA Detector R&D Roadmap**
 - Developed by the community to balance the detector R&D efforts in Europe
 - Highlighted the need for a new R&D phase in the form of DRD collaborations
 - To enhance the performance of the particle physics programme in the near and long term

ECFA R&D Roadmap
([link here](#))





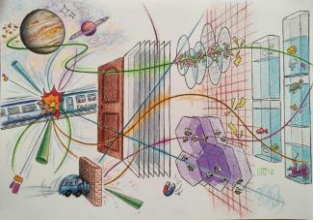
DETECTOR RESEARCH AND DEVELOPMENT THEMES (DRDTs) & DETECTOR COMMUNITY THEMES (DCTs)

From 01.01.2024

- The roadmap identified several R&D themes
- Critical to achieve the scientific programme in the ESPP (European Strategy for Particle Physics)
- Derived from the technological challenges that need to be overcome for the scientific potential of the future facilities

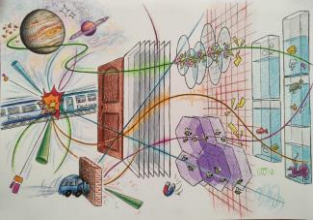
Gaseous	DRDT 1.1	Improve time and spatial resolution for gaseous detectors with long-term stability
	DRDT 1.2	Achieve tracking in gaseous detectors with dE/dx and dN/dx capability in large volumes with very low material budget and different read-out schemes
	DRDT 1.3	Develop environmentally friendly gaseous detectors for very large areas with high-rate capability
	DRDT 1.4	Achieve high sensitivity in both low and high-pressure TPCs
Liquid	DRDT 2.1	Develop readout technology to increase spatial and energy resolution for liquid detectors
	DRDT 2.2	Advance noise reduction in liquid detectors to lower signal energy thresholds
	DRDT 2.3	Improve the material properties of target and detector components in liquid detectors
	DRDT 2.4	Realise liquid detector technologies scalable for integration in large systems
Solid state	DRDT 3.1	Achieve full integration of sensing and microelectronics in monolithic CMOS pixel sensors
	DRDT 3.2	Develop solid state sensors with 4D-capabilities for tracking and calorimetry
	DRDT 3.3	Extend capabilities of solid state sensors to operate at extreme fluences
	DRDT 3.4	Develop full 3D-interconnection technologies for solid state devices in particle physics
PID and Photon	DRDT 4.1	Enhance the timing resolution and spectral range of photon detectors
	DRDT 4.2	Develop photosensors for extreme environments
	DRDT 4.3	Develop RICH and imaging detectors with low mass and high resolution timing
	DRDT 4.4	Develop compact high performance time-of-flight detectors
Quantum	DRDT 5.1	Promote the development of advanced quantum sensing technologies
	DRDT 5.2	Investigate and adapt state-of-the-art developments in quantum technologies to particle physics
	DRDT 5.3	Establish the necessary frameworks and mechanisms to allow exploration of emerging technologies
	DRDT 5.4	Develop and provide advanced enabling capabilities and infrastructure

Calorimetry	DRDT 6.1	Develop radiation-hard calorimeters with enhanced electromagnetic energy and timing resolution
	DRDT 6.2	Develop high-granular calorimeters with multi-dimensional readout for optimised use of particle flow methods
	DRDT 6.3	Develop calorimeters for extreme radiation, rate and pile-up environments
Electronics	DRDT 7.1	Advance technologies to deal with greatly increased data density
	DRDT 7.2	Develop technologies for increased intelligence on the detector
	DRDT 7.3	Develop technologies in support of 4D- and 5D-techniques
	DRDT 7.4	Develop novel technologies to cope with extreme environments and required longevity
	DRDT 7.5	Evaluate and adapt to emerging electronics and data processing technologies
Integration	DRDT 8.1	Develop novel magnet systems
	DRDT 8.2	Develop improved technologies and systems for cooling
	DRDT 8.3	Adapt novel materials to achieve ultralight, stable and high precision mechanical structures. Develop Machine Detector Interfaces.
	DRDT 8.4	Adapt and advance state-of-the-art systems in monitoring including environmental, radiation and beam aspects
Training	DCT 1	Establish and maintain a European coordinated programme for training in instrumentation
	DCT 2	Develop a master's degree programme in instrumentation



Areas of 'Detector R&D'

- **Strategic R&D via DRD Collaborations**
 - Long-term strategic R&D lines
 - To address the high-priority items defined in the Roadmap via the DRDTs
- **'Blue-sky' R&D**
 - Competitive
 - Short-term responsive grants
 - Nationally organised
- **Experiment-specific R&D**
 - With very well defined detector specifications
 - Funded outside of the DRD programme, via experiments



Timeline for establishing the DRDs

DRD3

Q4 2022

- **DRD proposal teams** formed to lead the preparation of the DRD proposals in each area

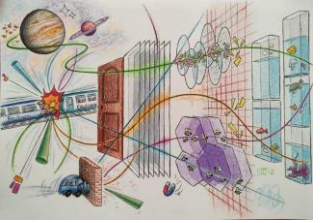
Q1 2023

- Each DRD proposal team calls for expressions of interest from institutes and **community workshops** take place
- DRDC membership appointments begin

Q2 2023

- The **new DRD proposals are developed** based on the detector roadmap and community interest
- Mechanisms **agreed with funding agencies** for structuring country-specific DRD collaboration funding requests

Why we are here today!



Timeline for establishing the DRDs

DRD3

Q3 2023

- **The DRD proposal teams submit full DRD Proposals**, including estimates of the resources needed

Q4 2023

- Following the review and revision (if required) of proposals, the DRDC recommends the formal establishment of the DRD collaborations
- Formal **approval** is given by the CERN Research Board

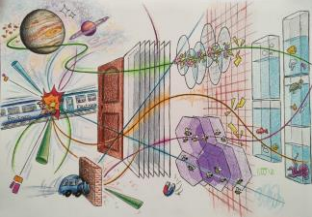
2024

- **Collection of MoU signatures**

Formal start of the DRD Collaborations

(01.01.2024)

(End of current RD Collaborations)



Writing the DRD3 proposal

DRD3

DRD3 questionnaire (< 03.23)

DRD3 Workshop on 22-23 March 2023

**Expression of interest for participation in
DRD3 – R&D on Solid State Detectors**

Background information: <https://indico.cern.ch/event/1214410/>

Instructions ([Replace or delete the blue example text!](#))

Fill only one form per institution.

Name of the institution, full address:

Country:

Contact person(s) (full name and email):

- Person 1, email
-

CERN and other experiments (participation in running experiments & projects)

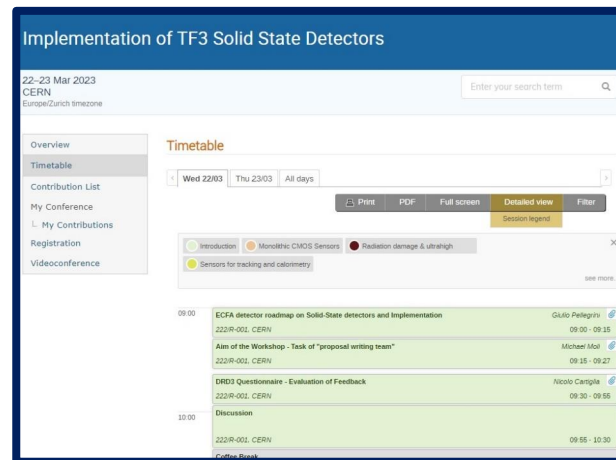
- ...example: RD50, ATLAS, Belle, ITER

Size of the group interested in the DRD3 activities
(approx. FTE of

12 questionnaires from the UK

In the following, we want to know your views on the outline your research interest and the infrastructure/equipment/acilities available at your institution. Based on the ECFA roadmap

DRD3 workshop (03.23)



- To gather inputs from the community
- To propose a way forward (milestones & deliverables)

DRD3 second questionnaire (06.23)

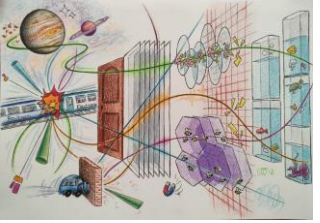
- More specific
- Will ask people to detail for which milestones and deliverables they want to be active
- Will also ask for moneys and FTEs

DRD3 proposal draft (06.23)

- Will be circulated

DRD3 proposal (07.23)

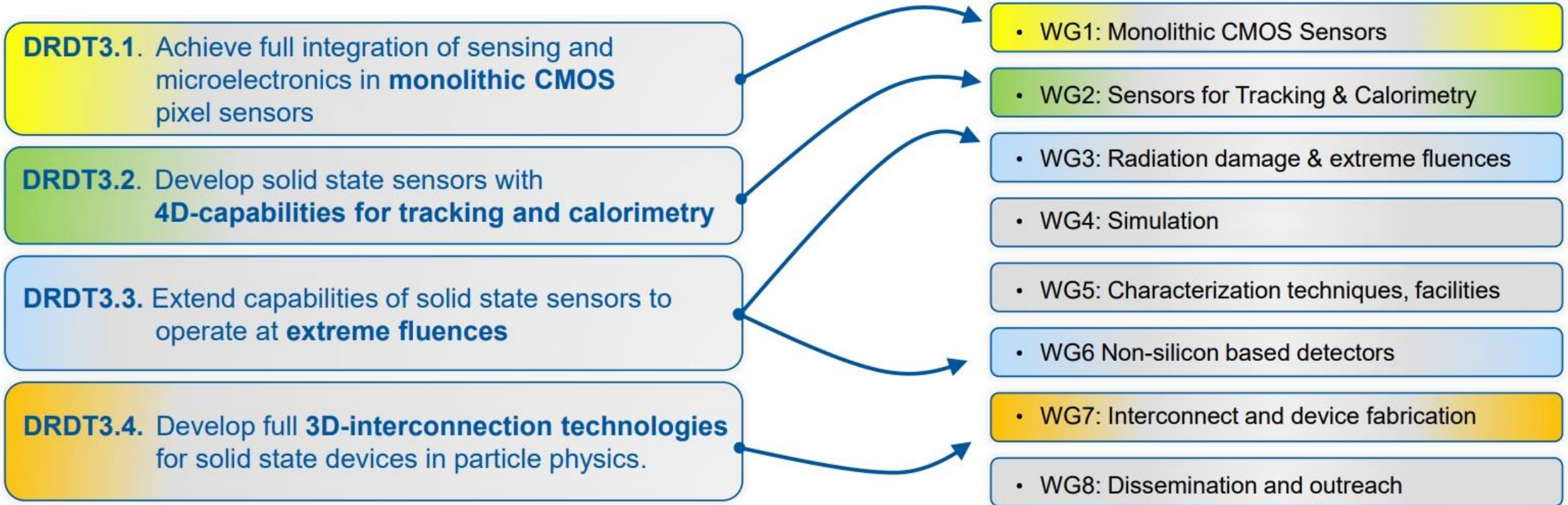
- Will be submitted to DRDC



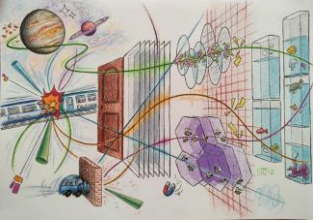
DRD3 themes coverage

Within the ECFA roadmap
4 Detector R&D Themes (DRDTs)
have been identified for the
Solid State Detectors in particle physics.

- We are covering all ECFA DRDTs
- Additional WGs were added to cover simulations, facilities and dissemination corresponding to General Strategic Recommendations (GSRs) in the ECFA roadmap



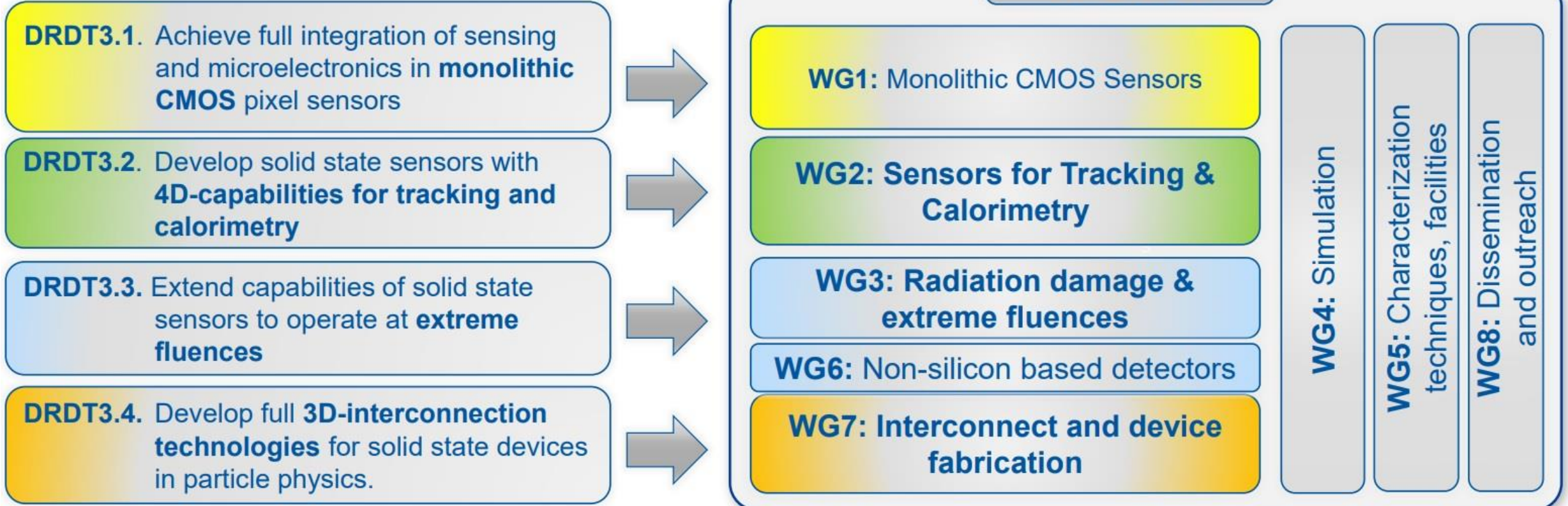
M. Moll



DRD3 themes coverage

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M. Moll

Implementation of TF3 Solid State Detectors

22-23 Mar 2023
CERN
Europe/Zurich timezone

Overview

Timetable

Contribution List

My Conference

My Contributions

Implementation of TF4 Photon Detectors and PID

1 January 2023 to 20 June 2023
Europe/Zurich timezone

Overview

Timetable

Registration

Short Chronology of actions

- Peter Krizan (JSI Ljubljana) creation of DRD4 on PID
- A first meeting was held with PID experts
- The links to 2 questions need your input/feedback the indico site (only for PID experts)
- A live community meeting scientific and organisational
- Stay posted! Please

Starts 1 Jan 2023
Ends 20 Jun 2023
Europe/Zurich timezone

Christian Joram
Peter Krizan
Peter Krizan

Registration

View as list

Workshop on establishing the DRD5 / RDq collaboration for Quantum Sensing detector R&D

Researchers in the field of Quantum Sensing (QS) and Quantum Sensing (TF5) has identified shared interests to form a dedicated collaboration

ECFA Detector R&D Roadmap Task Force

Thursday 12-Jan-2023 09:00 - 18:00
222/P-001 (CERN)
Felix Seifrow (Deutscher Elektronenbeschleuniger)

Registration

Participants

Videoconference

09:00 - 09:30

Introduction to the task force

Speakers: Roberto Feltri

09:45 - 10:50

Sandwich calorimeters

Speakers: David Ganey, Christian Joram

09:45

Electromagnetic calorimeters

Speakers: Adrian Lifan

DRD5

OPEN-PHO-LIFE-2023-027

DRD6

Implementing DRD7: an R&D Collaboration on Electronics and On-detector Processing

14-15 Mar 2023
CERN
Europe/Zurich timezone

Overview

Timetable

Contribution List

Registration

Timetable

Tue 14/03 Wed 15/03 All days

4D techniques

Data Density

Intelligence on detector

09:00

Introduction

09:00

09:00

09:00

09:00

09:00

09:00

09:00

09:00

09:00

DRD2

Implementation of TF2 Liquid Detectors. - 20 April 2023 (Remote Meeting)

1 Jan 2023, 09:00 -> 20 Jun 2023, 11:00
Europe/Zurich

Ian Shipsey (University of Oxford (GB)), Jocelyn Rebecca Monroe (University of London (GB)), Roxanne Guenet

Description We are hosting a fully remote event on 20 April from 11AM to 6PM CEST. We will connect via zoom: [zoom link](#)

->PLEASE REGISTER if you are interested in the DRD2 event. We can contact you later with your details.

DRD1

DRD1 Community Meeting

1-3 Mar 2023
CERN
Europe/Zurich timezone

Overview

Timetable

Contribution List

Registration

Support

florian.brumbauer@cern.ch

erikato.oliven@cern.ch

Timetable

Wed 01/03 Thu 02/03 Fri 03/03 All days

General

WG1: Technologies

WG2: Applications

WG3: Gas and material studies

09:00

ECFA Roadmap and implementation

307-018 - Kjell Johnsen Auditorium, CERN

10:00

Coffee break

307-018 - Kjell Johnsen Auditorium, CERN

Introduction

307-018 - Kjell Johnsen Auditorium, CERN

Series of workshops during the first half of 2023 to organise the communities towards forming the new collaborations

DRD8 felt their area is too experiment specific to be the topic of a "Strategic R&D" bid. DRD9 is taken care of by a new ECFA Training Panel while.