Solid State Detectors Session
Welcome!

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(3rd June 2021)

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PPTAP detector workshop

Science and Technology Facilities Council

AIMS OF THE WORKSHOP:

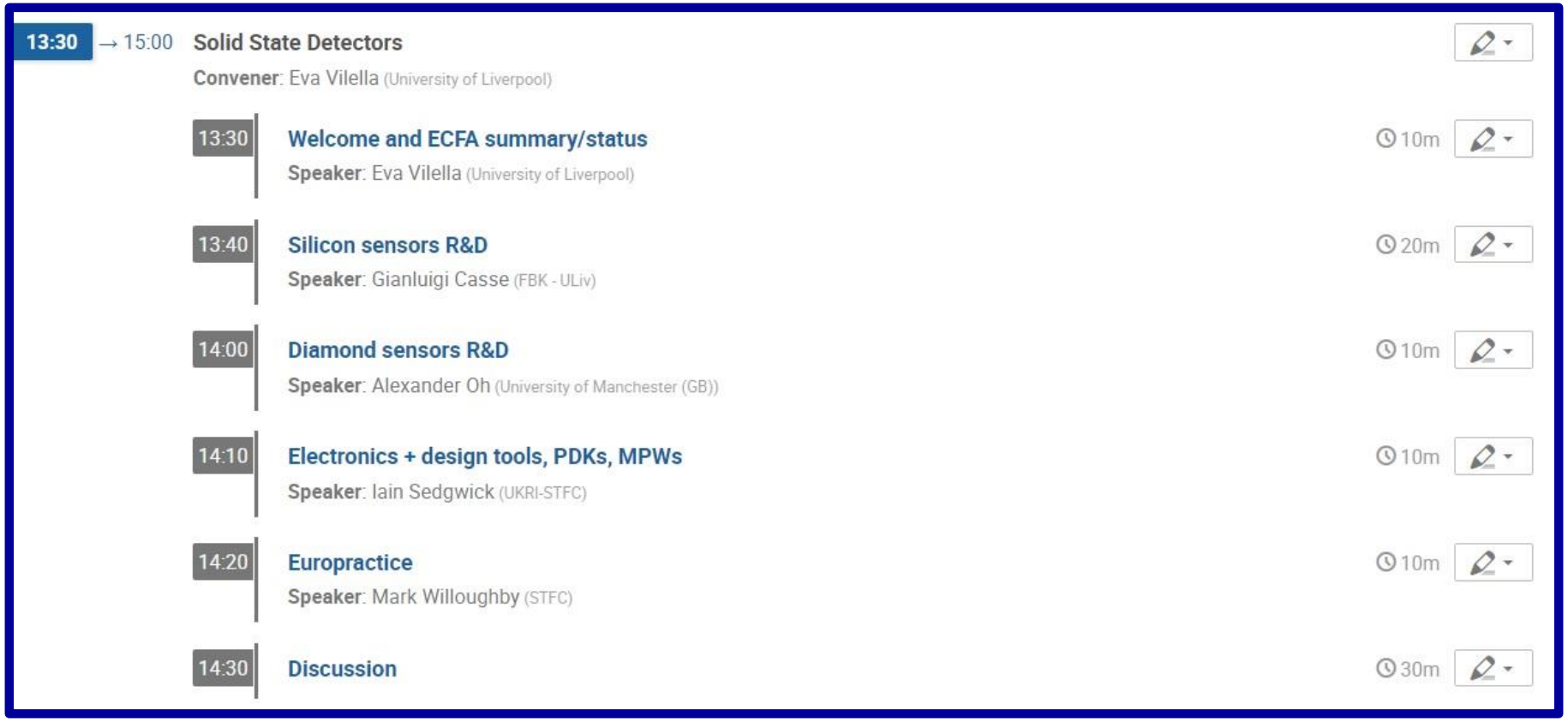
1. Gather input from the community to draft the UK roadmap to detector R&D following ECFA symposia consultation phase.
2. Highlight common interests between groups and with industry.
3. Gather visions for R&D structure in the next years.

Sample of questions for discussion:

- What are the key technical challenges for the UK in each R&D area?
- What are the organisational / logistical barriers for us?
- How much is all this going to cost? Is it justified?
  -- What is the likely UK participation in future projects?
  -- What is the length, breadth and scale of R&D activities leading to them?
  -- Are there commonalities we can exploit?
  -- What demonstrator / exemplar projects should we target, and when?
- How do we ensure and maintain efficiency?
  -- Commonalities between projects
  -- Reduction of internal design competition
- What happens if we do nothing?
- What is the relationship with industry and other research areas?
- How do we convince people to act on this?
- How do we sustain a community?

PPTAP Solid State Detectors – Today's agenda

- Set of talks covering several areas
- 30 minutes discussion at the end
- Speakers please keep your talks within your allocated time



The ECFA Detector R&D Roadmap: Status TF3

D. Bortoletto
University of Oxford

ECFA
European Committee for Future Accelerators

European Particle Physics Strategy Update

- "Organised by ECFA, a roadmap should be developed by the community to balance the detector R&D efforts in Europe, taking into account progress with emerging technologies in adjacent fields."
- "The roadmap should identify and describe a diversified detector R&D portfolio that has the largest potential to enhance the performance of the particle physics programme in the near and long term."
- "Detector R&D activities require specialised infrastructures, tools and access to test facilities."
- "The community should define a global detector R&D roadmap that should be used to support proposals at the European and national levels."

*community feedback via RECFA delegates and National Contacts

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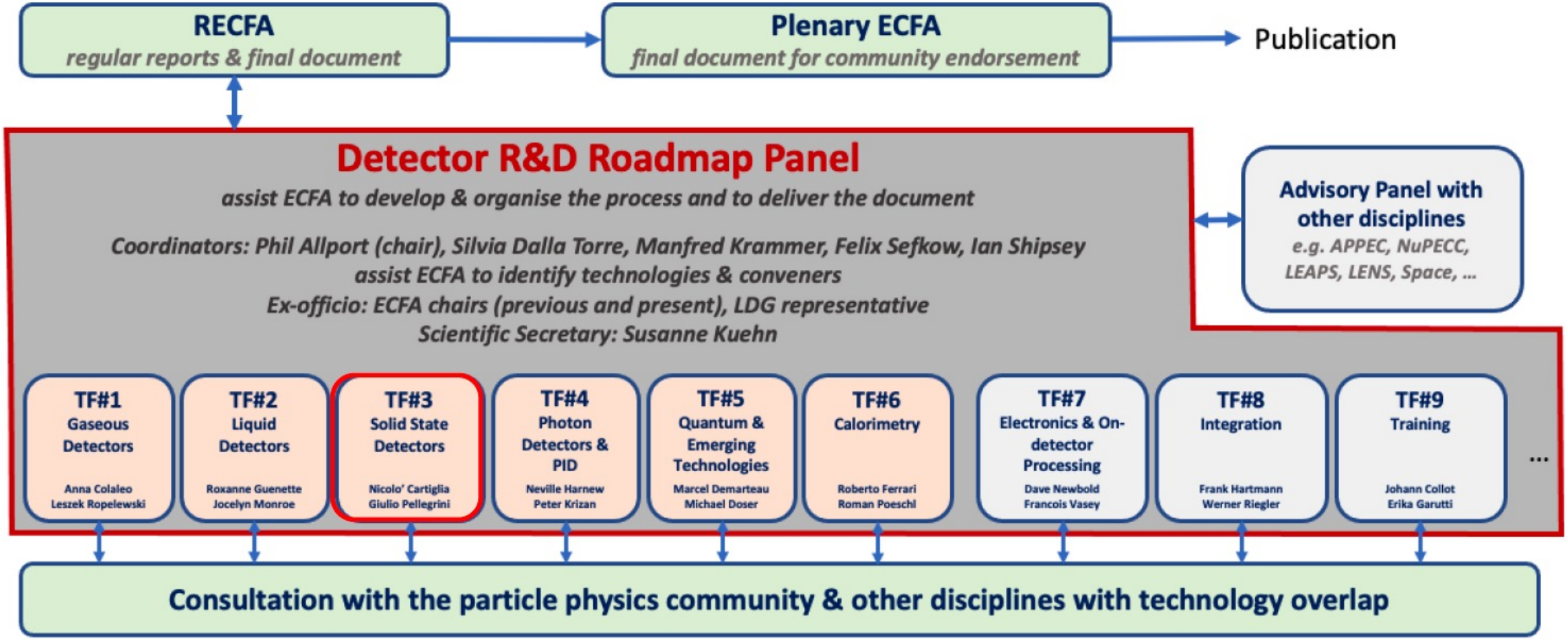
Consultation with the HEP Community



https://indico.cern.ch/e/ECFADetectorRDRoadmap

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Roadmap Process

Organisation

May 2020
ESPPU mandate to ECFA to develop a roadmap for detector R&D efforts in Europe

Sep 2020
Structure in place with **Detector R&D Roadmap Panel**

Dec 2020
Task Forces active

Website:
https://indico.cern.ch/e/ECFADetectorRDRoadmap

Expert & Community Consultation

Feb 2021
Collection of requirements of future facilities & projects

Feb/March 2021
Questionnaires of Task Forces to national contacts

Task Forces liaise with experts in
- ECFA countries
- adjacent disciplines
- industry

March-May 2021
Open Symposia

Drafting Roadmap & Feedback

May 2021
Task Forces collate input from symposia

25-28 May 2021 **Drafting sessions**
- opening session with all experts involved
- plenary & parallel sessions with Task Force members
- final session of Roadmap Panel

2 July 2021
Near final draft shared with RECFA*

30 July 2021
Presentation at Joint ECFA-EPS session

Until Sep 2021
Collect final community feedback*

Oct 2021
Detector R&D Roadmap Document submission to RECFA and afterwards to PECFA and Council

*community feedback via RECFA delegates and National Contacts

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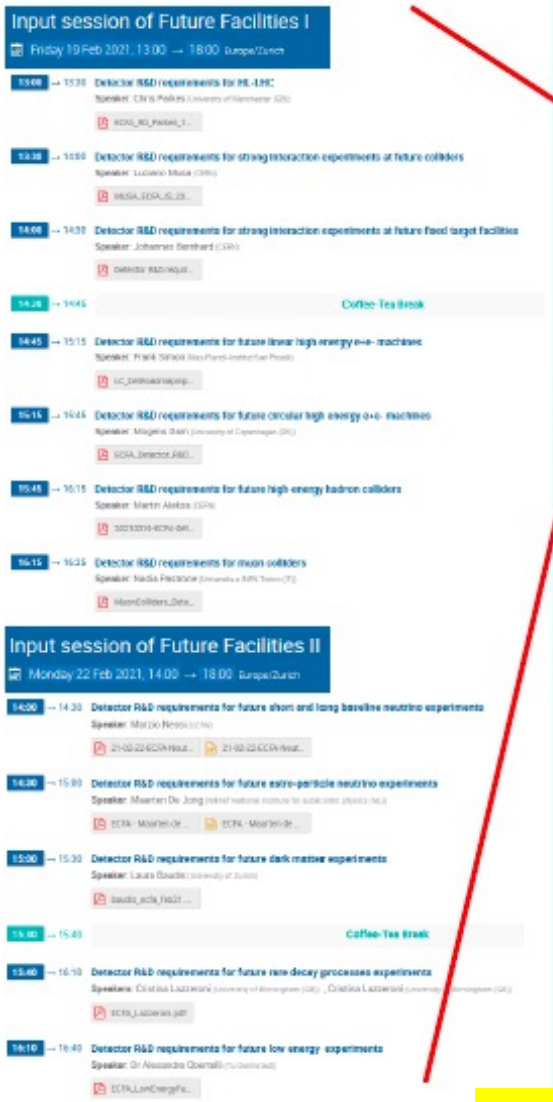
Roadmap Process



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March-May 2021
Open Symposia

May 2021

- 07 May ECFA Detector R&D Roadmap Symposium of Task Force 6 Calorimetry
- 06 May ECFA Detector R&D Roadmap Symposium of Task Force 4 Photon Detectors and Particle Identification Detectors

April 2021

- 30 Apr ECFA Detector R&D Roadmap Symposium of Task Force 9 Training
- 29 Apr ECFA Detector R&D Roadmap Symposium of Task Force 1 Gaseous Detectors
- 23 Apr ECFA Detector R&D Roadmap Symposium of Task Force 3 Solid State Detectors
- 12 Apr ECFA Detector R&D Roadmap Symposium of Task Force 5 Quantum and Emerging Technologies
- 09 Apr ECFA Detector R&D Roadmap Symposium of Task Force 2 Liquid Detectors

March 2021

- 31 Mar ECFA Detector R&D Roadmap Symposium of Task Force 8 Integration
- 25 Mar ECFA Detector R&D Roadmap Symposium of Task Force 7 Electronics and On-detector Processing

Materials from past Symposia, Input Sessions and other components of the ECFA Detector R&D Roadmap Process can be found at https://indico.cern.ch/e/ECFADetectorRDRoadmap

https://indico.cern.ch/event/957057/

Roadmap Process

ECFA

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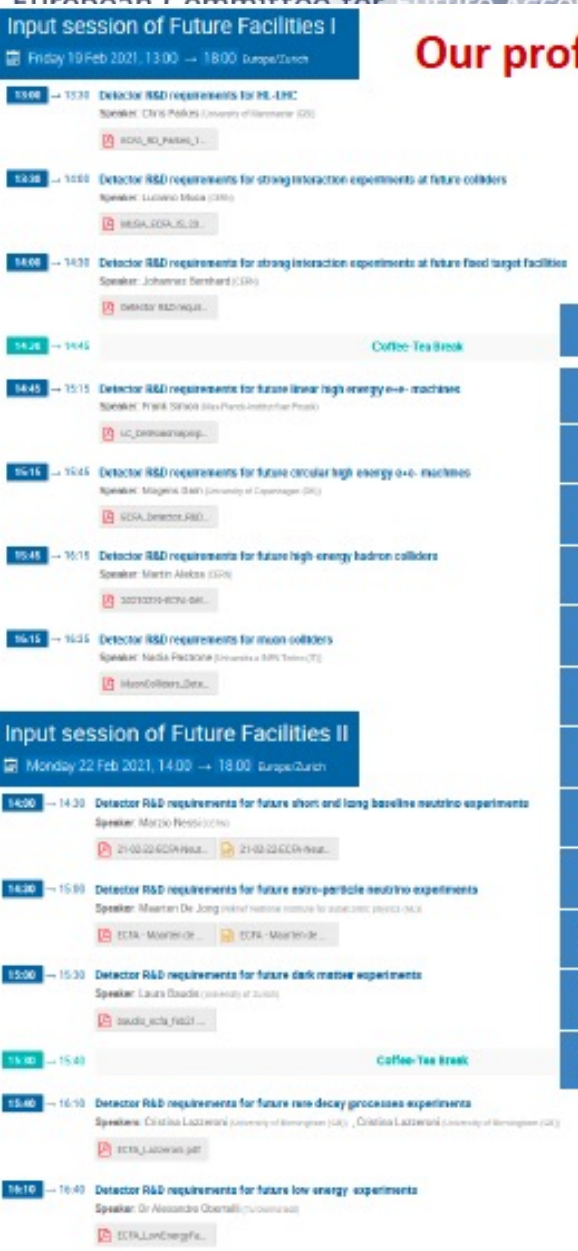

Our profound thanks to all the Input Session speakers for their great presentations and invaluable material

We particularly ask you to note if there are unmet R&D needs for the ESPP identified programme that you think we have overlooked in today's material

	Speaker	Presentation Topic
1	Chris Parkes	Detector R&D requirements for HL-LHC
2	Luciano Musa	Detector R&D requirements for strong interaction experiments at future colliders
3	Johannes Bernhard	Detector R&D requirements for strong interaction experiments at future colliders
4	Frank Simon	Detector R&D requirements for future linear high energy e+e- machines
5	Mogens Dam	Detector R&D requirements for future circular high energy e+e- machines
6	Martin Aleksa	Detector R&D requirements for future high-energy hadron colliders
7	Nadia Pastrone	Detector R&D requirements for muon colliders
8	Marzio Nessi	Detector R&D requirements for future short and long baseline neutrino experiments
9	Maarten De Jong	Detector R&D requirements for future astro-particle neutrino experiments
10	Laura Baudis	Detector R&D requirements for future dark matter experiments
11	Cristina Lazzeroni	Detector R&D requirements for future rare decay processes experiments
12	Alexandre Obertelli	Detector R&D requirements for future low energy experiments

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Roadmap Process

Thank you to everyone who contributed to these nine highly intense full-day public meetings

We very much appreciate all the painstaking preparation work by the presenters and organisers

Task Force	TF7	TF8	TF2	TF5	TF3	TF1	TF9	TF4	TF6
Dates	25/3/21	31/3/21	9/4/21	12/4/21	23/4/21	29/4/21	30/4/21	6/5/21	7/5/21
Unique users	369 + 123 (webcast)	154 + 17 (webcast)	197 + 5 (webcast)	220	504	339	105	207	201
Max. number of concurrent viewers	230 + 123 (webcast)	76 + 17 (webcast)	130 + 5 (webcast)	100	275	191	59	110	115

Common registration for the symposia had logged 1359 participants by the end of the last one. Many thanks to everyone for joining the discussions and giving feedback.

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TF3 Symposium

- Vision on electronics for future trackers in 20 years, 3D integration (V. Re)
- Summary of accelerator input section (D. Contardo)
- 4D tracking - sensors without internal gain - 3D and more, intrinsic limitation (G. Kramberg)
- 4D tracking - sensors with internal gain (N. Cartiglia)
- Silicon at extreme fluences (M. Mikuz)
- Passive CMOS in 20 years (D-L Pohl)
- Future CMOS technologies for charge particles tracking and time resolution- beyond 65 nm (W. Snoeys)
- Evolution of the CMOS technology for monolithic detectors, 20 years visionary talk (Petra Ridler)
- Future Requirements on Interconnection Technologies for Hybrid Modules (Thomas Friezsch)
- Use of diamond detectors in 20 years: what R&D needs to be done to use it in the first layer of FCC? (Alexander Oh)
- Simulation tools for radiation detectors before and after irradiation (Joern Schwandt)
- Panel discussions
  - Beam test/irradiation/femto laser: key facilities needed to pursue the R&D phase Dr Ivan Vila Alvarez, Marcel Stanitzki, Marko Mikuz
  - Industrialization/supply chain for small - medium - large project (EU project, funding tools - Iain Sedgwick, Jerome Baudot, Michael Campbell

https://indico.cern.ch/event/999816/)

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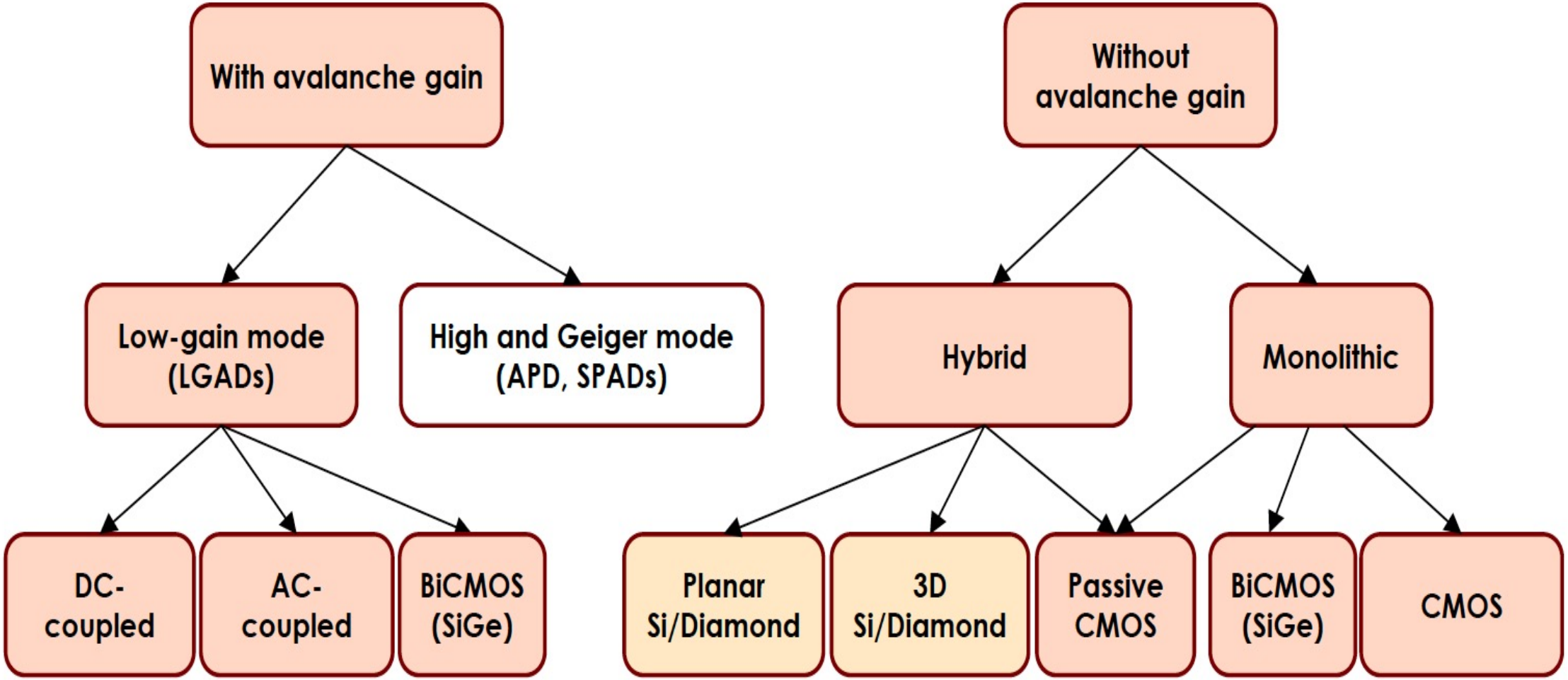
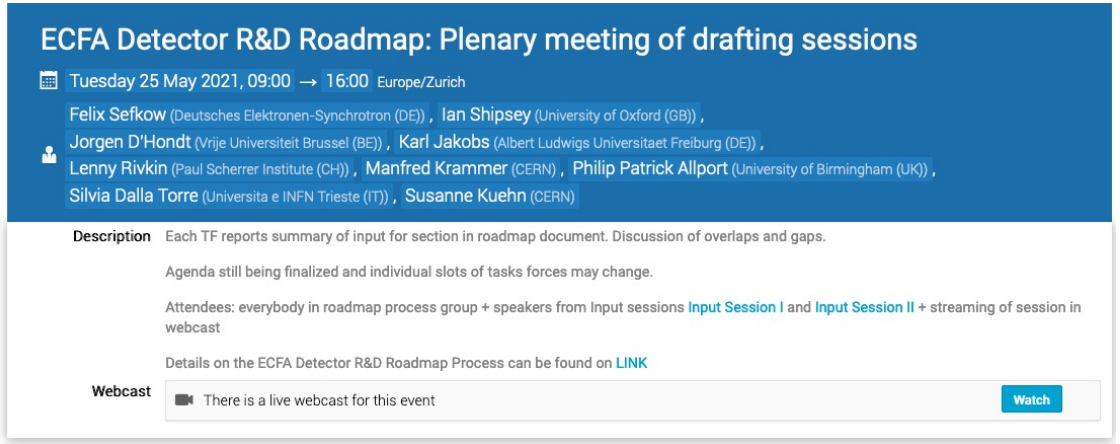
TF3



D. Bortoletto, **N. Cartiglia**, D. Contardo, I. Gregor, G. Kramberger, **G. Pellegrini**, H. Pernegger.

Drafting sessions

- Three extraordinarily busy days: https://indico.cern.ch/event/1037113/
- Developed technical details of the drafting sessions
- Joint plenary sessions
- TF Parallel Sessions
- Cross-TF Sessions:
  - Test beams and irradiations
  - TF3&TF6, TF3&TF7



- Each TF was asked to:
  - Prepare a "**Detector Readiness Matrix**" for a high-level introduction in terms of facility/area R&D needs and consequences if needs are not met
  - Identify "**Detector Research and Development Themes**"
  - Define the sections of the final document

Timeline of documents

Task	(Current) Date
Drafting Sessions	**25.-28.5.21**
Finalize and combine sections of TFs	15.6.21
Include comments of process group	30.6.21
First draft to RECFA	**2.7.21**
Implementation of comments by RECFA and APOD	3 weeks
Meeting of coordinators and TF convenors	**Around 20.7.21 (doodle to come)**
Presentation at Joint ECFA-EPS session	**30.7.21**
Consolidation of document and preparation of glossy summary	4 weeks
Provide final documents to IR-ECO	**Beginning of September**
Final electronic version of documents	Mid October
Printing	4 weeks
Endorsement by ECFA	**19.11.21**
Printed documents for Council	**December 21**