

R&D Session Forum on Tracking Detector Mechanics 2021

May 19, 2021

Burkhard Schmidt

R&D Session at Cornell in 2019

	Introduction to the R&D session <i>Clark Hall Room 700, Cornell University</i>	<i>Burkhard Schmidt</i> 	14:25 - 14:35
	Interlocking Super Modules for Future Large Area Tracking Systems <i>Clark Hall Room 700, Cornell University</i>	<i>Peter Cooke et al.</i> 	14:40 - 15:00
15:00	CERN R&D lines for the mechanics of future tracking detectors <i>Clark Hall Room 700, Cornell University</i>	<i>Corrado Gargiulo</i> 	15:10 - 15:25
	R&D ideas at DESY <i>Clark Hall Room 700, Cornell University</i>	<i>Andreas Mussgiller</i> 	15:30 - 15:45
16:00	R&D ideas at LBNL <i>Clark Hall Room 700, Cornell University</i>	<i>Eric Anderssen</i> 	15:50 - 16:05
	Coffee <i>Clark Hall Room 700, Cornell University</i>		16:10 - 16:40
	Development of advanced micro-channel cooling solutions for silicon detectors <i>Clark Hall Room 700, Cornell University</i>	<i>Alessandro Mapelli et al.</i> 	16:40 - 16:55
17:00	R&D for a colder future in HEP <i>Clark Hall Room 700, Cornell University</i>	<i>Bart Verlaat et al.</i> 	17:00 - 17:15
	R&D ideas in relation to robotics <i>Clark Hall Room 700, Cornell University</i>	<i>Corrado Gargiulo et al.</i> 	17:20 - 17:35
18:00	Discussion <i>Clark Hall Room 700, Cornell University</i>		17:40 - 18:20
	Thoughts about an R&D collaboration on Detector Mechanics <i>Clark Hall Room 700, Cornell University</i>	<i>Burkhard Schmidt</i> 	18:20 - 18:40

Mechanics

Oxford

CERN

DESY

LBNL

Cooling & Robotics

Valencia

CERN

CERN

Discussion of R&D collaboration

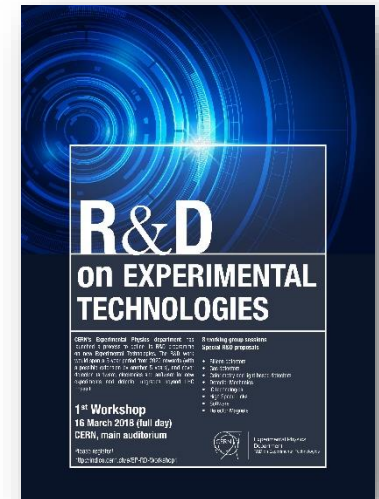
What has happened since ? (I)

- The CERN EP program for R&D on Experimental Technologies has been approved and receives funding (resources) since 2020.

- The chapter on **Detector Mechanics** has four research lines:

1. **Low mass mechanics** for tracking detectors
2. **Low mass composite cryostat** for future HEP experiments
3. Interfaces and services for automated installation and maintainability (**Robotics**)
4. **High-performance cooling** for future detectors

- You will get an update today on what has been achieved so far on low mass mechanics (e.g. ALICE ITS3) and on robotics



What has happened since ? (II)

- The AIDAInnova project (Advancement and Innovation for Detectors at Accelerators) has been approved and began on 1 April 2021.

The project will run for 4 years.



- AIDAInnova has **45 beneficiaries** and many **associate partners** will connect together within the AIDAInnova framework
- It has a chapter on **advanced mechanics for tracking and vertex detectors** with four research lines:
 1. Pursue R&D on **μ -channel fabrication processes**
 2. Solutions for **hydraulic connections and interconnections**
 3. **Refrigerant fluids** for warm and cold applications
 4. Instrumentation for accurate **absolute position measurements**
- **You will hear today about collaboration on R&D for μ -channel fabrication processes and other topics.**

What has happened since ? (III)

ECFA

European Committee for Future Accelerators



Detector R&D Roadmap



- **Goal as specified in the mandate:**

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.

- **Transverse Task Force 8:**

It covers **Lightweight Mechanics, Local Cooling**, Cooling Systems, Magnet Systems, Machine Detector Integration, Monitoring and Robotics






- The Symposia, organized in the past 2 months, brought together a huge amount of interesting R&D aspects

➤ **Clearly, there are links with the R&D we are interested in**

Goal of this session

- Inform each other about intended and ongoing R&D on Tracking Detector Mechanics and Cooling.
- Try to identify R&D areas where we see possibilities to collaborate and create synergies. This might enhance also the possibilities for (additional) funding.
- Get some information about the possibility to involve industrial partners, as some R&D options pursued are also of interest for them.

Agenda

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|--------------|---------|--|-------|--|
| 16:20 | → 16:30 | R&D Session Introduction, Goals of the session
Speaker: Burkhard Schmidt (CERN) | 🕒 10m |  |
| 16:30 | → 16:50 | Challenges and R&D for the mechanics ALICE ITS 3
Speaker: Corrado Gargiulo (CERN) | 🕒 20m |  |
| 17:00 | → 17:20 | R&D considerations on lightweight mechanics
Speakers: Andreas Jung (Purdue University (US)) , Massimo Angeletti (EPFL - Ecole Polytechnique Federale Lausanne (CH)) | 🕒 20m |  |
| 17:30 | → 17:50 | Challenges and R&D on cooling for tracking detectors
Speaker: Marcel Vos (IFIC Valencia (ES)) | 🕒 20m |  |
| 18:00 | → 18:20 | Robotics
Speaker: Lorenzo Teofili (CERN) | 🕒 20m |  |