Welcome to the
36th RD50 Workshop

CERN, online, 3-5.6.2020

- Outline
  - Some recent RD50 news
  - This Workshop

The RD50 Collaboration

- RD50: 63 *institutes and 370 members*

50 European institutes

Austria (HEPHY), **Belarus** (Minsk), **Czech Republic** (Prague (3x)), **Finland** (Helsinki, Lappeenranta), **France** (Marseille, Paris, Orsay), **Germany** (Bonn, Dortmund, Freiburg, Göttingen, Hamburg (2x), Karlsruhe, Munich(2x)), **Greece** (Demokritos), **Italy** (Bari, Perugia, Pisa, Trento, Torino), **Croatia** (Zagreb), **Lithuania** (Vilnius), **Montenegro** (Montenegro), **Netherlands** (NIKHEF), **Poland** (Krakow), **Romania** (Bucharest), **Russia** (Moscow, St.Petersburg), **Slovenia** (Ljubljana), **Spain** (Barcelona(3x), Santander, Sevilla (2x), Valencia), **Switzerland** (CERN, PSI, Zurich), **United Kingdom** (Birmingham, Glasgow, Lancaster, Liverpool, Oxford, Manchester, RAL)

3 new members 2019

Full member list: www.cern.ch/rd50

8 North-American institutes

Canada (Ottawa), **USA** (BNL, Brown Uni, Fermilab, LBNL, New Mexico, Santa Cruz, Syracuse)

1 Middle East institute

Israel (Tel Aviv)

2 Asian institutes

China (Beijing-IHEP, Hefei), **India** (Delhi)

New members 11/2019

- Carleton University; NRC (National Research Council) Group, **Ottawa**, Canada
  - Team leader: Thomas Koffas

- University of **Montenegro**, Faculty of Sciences and Mathematics,
  - Team Leader: Gordana Lastovicka-Medin

- Department of Modern Physics and State Key Laboratory of Particle Detection and Electronics; University of Science and Technology of China (USTC); **Hefei**, P. R. China
  - Team Leader: Yanwen Liu

RD50 Organizational Structure

Co-Spokespersons

Gianluigi Casse   and   *Michael Moll*
(Liverpool University, UK   (CERN EP-DT)
& FBK-CMM, Trento, Italy)

Defect / Material Characterization
Ioana Pintilie
(NIMP Bucharest)

- Characterization of microscopic properties of standard-, defect engineered and new materials; pre- and post- irradiation
- DLTS, TSC, ….
- SIMS, SR, …
- NIEL (calculations)
- Cluster and point defects
- Boron related defects
- SiC based detectors

Detector Characterization
Eckhart Fretwurst
(Hamburg University)

- Characterization of test structures (IV, CV, CCE, TCT,.)
- Development and testing of defect engineered devices
- EPI, MCZ and other materials
- NIEL (experimental)
- Device modeling
- Operational conditions
- Common irradiations

- Wafer procurement (M.Moll)
- Acceptor removal (Kramberger)
- TCAD modeling (J.Schwandt)

New Structures
Giulio Pellegrini
(CNM Barcelona)

- 3D detectors
- Thin detectors
- Cost effective solutions
- Other new structures
- Detectors with internal gain
- LGAD:Low Gain Avalanche Det.
- Deep Depleted Avalanche Det.
- Slim Edges
- HVCMOS

- LGAD (S.Hidalgo)
- HVCMOS (E. Vilella)

Full Detector Systems
Gregor Kramberger
(Ljubljana University)

- LHC-like tests
- Links to HEP (LHC P2, FCC)
- Links electronics R&D
- Low rho strips
- Sensor readout (Alibava)
- Comparison:
  - pad-mini-full detectors
  - different producers
- Radiation Damage in HEP detectors
- Timing detectors

- Test beams
  (M.Bomben & G.Casse)

Collaboration Board Chair & Deputy: G.Kramberger (Ljubljana) & J.Vaitkus (Vilnius), Conference committee: U.Parzefall (Freiburg)
CERN contact: M.Moll (EP-DT), Secretary: V.Wedlake (EP-DT), Budget holder: M.Moll & M.Glaser (EP-DT) , EXSO: R.Costanzi (EP-DT)

RD50 – 5 Year Work Plan

- **5 year work program submitted in May 2018**
  - Approved by CERN Research Board in June 2018

- **Workplan [70 milestones]**
  - **Defect and Material Characterization [16 MS]**
    - p-type silicon [7 MS]
    - Cluster defects [4 MS]
    - Theory of defects [5 MS]
  - **Device Characterization & Device Simulation [21MS]**
    - Silicon materials [5 MS]
    - Extreme fluences [5 MS]
    - Experimental techniques [3 MS]
    - Surface damage [1 MS]
    - TCAD simulations [7 MS]
  - **New structures [21 MS]**
    - 3D sensors [6 MS] ; LGAD [4 MS]
    - CMOS [6 MS] ; New Materials [5 MS]
  - **Full Detector Systems [12 MS]**
    - LHC [7 MS]; HL-LHC [3 MS]
    - FCC [2 MS]

https://cds.cern.ch/record/2320882/files/LHCC-SR-007.pdf
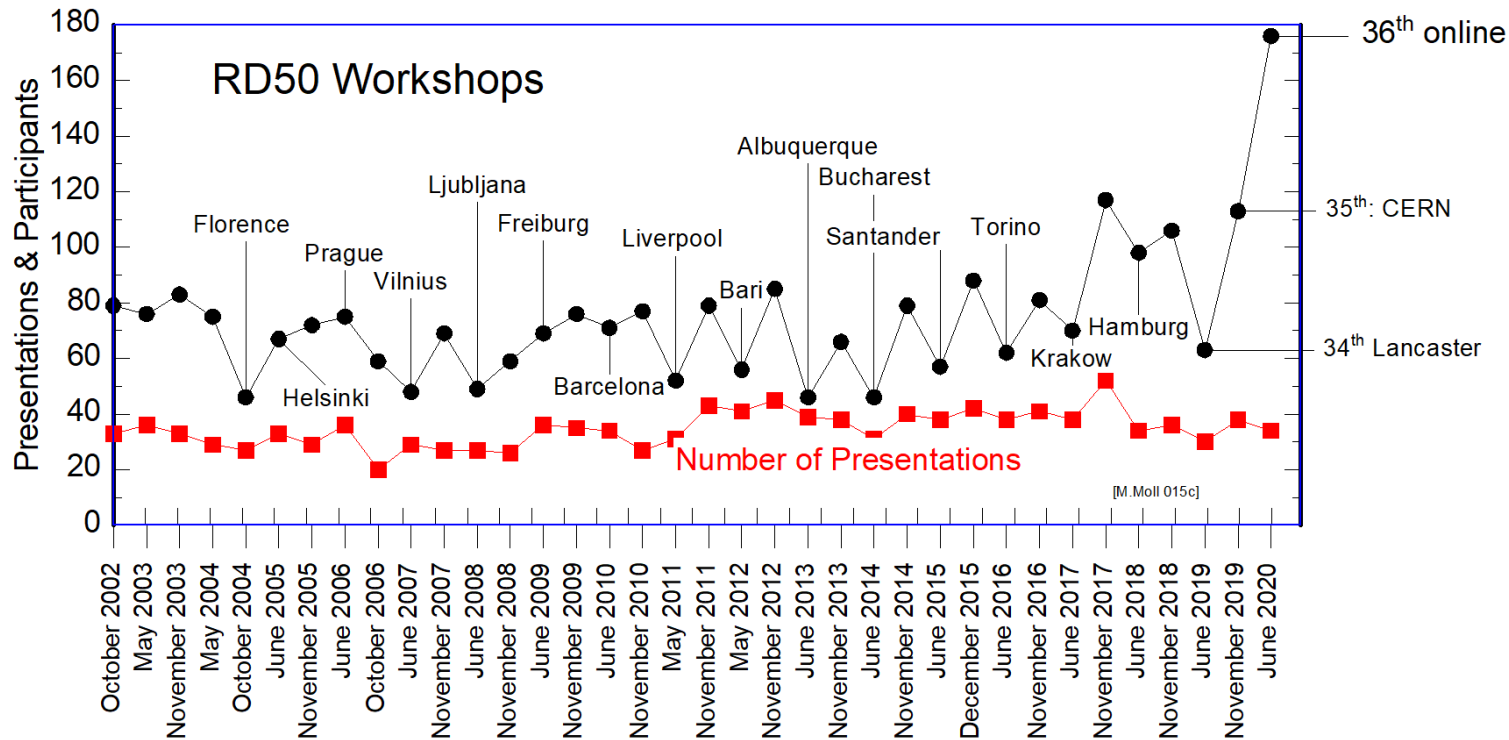
RD50 Workshops

- June 2020 - CERN - online workshop

  - Very high number of participants this time (176 registered); 34 talks + 4 discussions
  - Average numbers for RD50 Workshops: <35 talks> <74 participants>

- Next workshops:

  - November 2020: Zagreb, Croatia;
  - June 2021: Valencia;   November 2021: CERN;   June 2022 Seville

Program: 36th Workshop

- ## Wednesday 3.6.2020
  - Defect, Material and Sensor Characterization (6 talks + discussion)
  - NIEL, Irradiation facilities, TCT results (8 talks)
  - *Collaboration Board (closed session)*

- ## Thursday 4.6.2020 [10:00 – 17:30]
  - Simulations: Radiation Damage – Signal Formation (3 talks + discussion)
  - LGAD – Low Gain Avalanche Detectors (10 talks + discussion)

- ## Friday 5.6.2020 [11:00 – 16:00]
  - 11:00 EP seminar "Innovative silicon sensors for future trackers" by Nicolo Cartiglia, Marco Mandurrino
  - 13:00 CMOS sensors (6 talks + discussion)

Enjoy the Workshop!

…many thanks to

• *the session chairs and discussion session leaders*

• *the local organization team*

Anja, Esteban, Julian, Yana …and especially to Veronique Wedlake!