

# DRD4 – WG I: Photodetectors

Long term goal: Advance the detectors for PID and TOF identification systems of future HEP experiments.

- 33 Groups that expressed interest in this area in the questionnaire nr. 3 :
- AANL, Ancona, ARC, Barcelona, Bari, Birmingham, Bologna, Bristol, Bucharest, Cambridge, CERN, Erlangen, Ferrara, FBK, Geneva, Genova, Grenoble, GSI, HPK, IHEP-CAS-FPMT, Iowa, IRFU-CEA, Leicester, Ljubljana, Lyon, Maryland, Melbourne, Milano-Bicocca, Monash, Oxford, Perugia, Padova, RAL, Warwick
- Work programme: studies and development of novel photodetectors:
  - solid state - SiPMs,
  - vacuum based - MCP-PMTs,
  - hybrid photon detectors, other blue sky ideas.
  - + exchange of information on gas-based with DRD1.
- Follow the forum principle and **can be joined or left without formalities**.
- Purpose of a WG: exchange information, train younger people, expose problems, ask for advice and agree on best practices, common standards
- Loose work programme without agreed milestones and deliverables.
- Led by an expert in the relevant field facilitating and promoting the activities.
- No resources
- Standardizing procedures for the characterization of photon detectors, especially after exposure to extreme environmental conditions.

# WGI Topics

1. The resistivity of photon detectors to irradiation,
2. Long-term operation of photon detectors and mitigation measures to prolong their lifetime, e.g., low gain operation and annealing of SiPMs,
3. Operation of photon detectors in other extreme conditions, including cryogenic and high magnetic field operations.
4. Development of large-area fast SiPMs
5. Studies of large-area vacuum photo sensors, e.g., LAPPDs
6. Development of fine granularity detectors for future high-rate experiments.
7. Development of new technologies and their feasibility studies: CMOS-SPAD-based sensors, SiPMs with different internal structures, back-side illuminated SiPMs, etc.
8. Studies of new blue sky technologies for photon detection, e.g., Ge-on-Si APDs
9. Studies of hybrid photon sensors, e.g., Timepix-HPDs and MCP-HPDs
10. Studies and development of read-out electronics suitable for extreme environments (high- radiation, high magnetic field, low temperature )
11. Development of interconnection techniques for optimal integration of sensors and readout electronics.
12. Simulations of photodetector response

Open to accommodate new topics related to Photo detectors, not mentioned above!