DRD4: early stage research and development scheme proposals

A. Romano and T. Blake for DRD4

Proposals from DRD4

- Three proposals were put forward for discussion inside DRD4:
  - Investigation of novel gain structures in vacuum photon detectors.
  - Investigation of novel radiators for particle identification applications.
  - Development of a compact RICH detector for FCC-ee.
- We met as a community on April 18th to discuss the proposals
- Link to the UK-DRD4 meeting https://indico.cern.ch/event/1407812/

Novel gain structures for vacuum photon detectors

- Vacuum photon detectors have large area, good radiation hardness and can offer excellent timing resolution but have limited lifetimes and rate capability.
- Aim to develop novel gain structures using transmission dynode geometries to address the limitations.
- Goal of the proposal is to develop an MCP-PMT with a single diamond transmission layer.
- Link to industry: Photek (UK)
- Presentation by Jon Lapington here

Groups: Leicester, Bristol, Warwick, Birmingham

Novel radiators for particle identification

- Aim to develop new materials with tunable properties (e.g. refractive index) for novel radiators.
- Objectives: material tests, simulation studies, optimization of photon detector characteristics, and proof-of-concept reconstruction.
- Collaboration with UK industry for manufacturing and exploring new materials.
- Presentation by Michael Mccann here

Groups: Imperial, Bristol, Edinburgh, RAL

Compact RICH detector for FCC-ee

- Barrel geometry of the FCC-ee detectors would require compact, lightweight particle identification systems.
- A dual radiator RICH detector (ARC) with mixture of aerogel and gas radiators has been proposed to cover the necessary momentum range.
- Proposal covered necessary studies towards developing such a detector.
- Presentation by Guy Wilkinson here

Groups: Oxford, Bristol, Cambridge, RAL, Warwick

Proposals from DRD4

- Three proposals were put forward for discussion inside DRD4:
  - Investigating novel gain structures in vacuum photon detectors.
  - Investigating novel radiators for particle identification applications.
  - Development of a compact RICH detector for FCC-ee.
- We met as a community on April 18th to discuss the proposals.
  - All proposals were deemed to be good candidates for the scheme, fit with international DRD4 effort and had support from the community.
- The proposal on **novel gain structures in vacuum photon detectors** had the most community support and is attached to the agenda.