



Contribution ID: 451

Type: **Poster (one author must be in person)**

Future Circular Collider (FCC) Dual Readout: a step closer to a scalable solution

Thursday 8 June 2023 17:15 (1 minute)

Future ElectroWeak factories require unprecedented highly granular jet calorimeters energy resolution. This goal appears to be achievable only with an imaging calorimeter it exploits particle flow algorithms or a fiber sampling Dual Readout (DR) calorimeter using scintillation and Cherenkov effects, the former produced by all ionising particles, the latter only by relativistic charged particles. In both cases, many problems are still open and R&D is needed to build a hadron-sized prototype and evaluate the performance. Finally, new digital devices as digital SiPMs, currently not in the schedule, could lead to a simpler and innovative readout architecture.

The DR features absorber composed of stainless steel, and detector which are composed of scintillating and clear fibers. The former are sensitive to all kind of charged particles, to measure the total deposited energy, the latter are sensitive to Cherenkov light to measure EM shower parameters.

The Hydra-2 project aims to design, build and qualify prototype of fiber sampling granular DR calorimeter to evaluate:

- a) a stand-alone hadronic resolution around $30\%/\sqrt{E}$ or better, both for single hadrons and for jets, while maintain a resolution for isolated electromagnetic (em) showers close to $10\%/\sqrt{E}$;
- b) a transversal resolution of $O(1 \text{ mrad})/\sqrt{E}$;
- c) a longitudinal one of a few cm (by phasing);
- d) a modular and scalable construction technique;
- e) an innovative reading architecture based on SiPM;
- f) the performance of Deep Neural Network algorithms in exploiting such a large amount of (3D) information.

Primary author: Prof. GABRIELLI, Alessandro (Università e INFN, Bologna (IT))

Co-authors: FALCHIERI, Davide (Università e INFN, Bologna (IT)); VERI, Carlo (INFN - National Institute for Nuclear Physics); GIACOMELLI, Paolo (INFN Sezione di Bologna)

Presenters: Prof. GABRIELLI, Alessandro (Università e INFN, Bologna (IT)); GIACOMELLI, Paolo (INFN Sezione di Bologna)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters