

Organization of a FLARE technical group

Milind Diwan, Steve Linden

June 14, 2022

Technical Organizational issues

- Technical group - This group will have the specific focus on FLARE detector design and integration into the FPF.
 - Steve Linden and MVD will organize for the coming year.
 - Meetings have not been decided yet. We are consulting with key BNL technical people. Also needs considerable input from CERN people.
 - **This group will be responsible for detector feasibility and the pre conceptual design report. Target date for draft: December 2022.**
- We are planning for a workshop at the Center for Frontiers in Nuclear Science at Stony Brook (tentative October 10-12, 2022). We (JLF and MVD) may ask people to get involved in the organization of this workshop.
- New FLARE and neutrino physics postdoc opportunity will be advertised at BNL. Will be sent to this group.

Technical Group organization for FLARE.

Major packages of work for the CDR. Each of these packages will need a precise goal and authors/editors for the document. **Proposal below.**

- Simulations - Focus on neutrino physics goal of 1) detection, 2) CC energy measurement, 3) muon, electron, tau particle ID. This focus will lead to detector design and then we can also examine BSM physics reach. Keep simulations at the generic detector performance level (not detailed simulations at the digitization level). We need to understand what kind of resolution is really needed for physics.
 - Simulations need to include consideration of the background muon flux from the LHC. This is on-going work.
- Cryogenics and integration into FPF - Focus on membrane cryostat and modular approach to installation. Needs considerable input from CERN technical personnel.
- TPC design - Focus on modular TPC design with several options for gap size and orientation (E field parallel or perpendicular to the beam). No need to formulate a preference yet for the CDR.
- Anode and electronics design - Focus on optimizing anode and electronics design for high spatial resolution and multitrack resolution ($\ll 1$ mm ?). This is a key focus of any hardware R&D also.
- Photon sensor and trigger design - Optimize for expected muon rate and use existing designs from ICARUS/SBND/protoDUNE etc.

Partial list of technical resources

we would need to use these efficiently to perform prototyping work

1) CERN 50 liter system in bldg 182

2) CERN protoDUNEs. In particular, the technology for Xenon doping and light readout may be fully tested at scale here.

3) The small R&D setup at UCI.

4) The BNL 200 liter system and 20 liter system. This is in the process of being commissioned.

5) ASIC and SiPM testing facilities.

6) Fermilab testbeams and possibility of using LARIAT.

Status at CERN

Notes from Jamie Boyd.

- At CERN Forward Physics Facility is studied in the context of Physics Beyond Colliders. CERN has committed some resources for civil engineering, safety, FLUKA simulation and integration studies.
 - (MVD is now a member of the PBC group)
- There is interest from the Neutrino Platform. Resource request is being considered.