

Report card on FPF/FLARE

Milind Diwan Nov 1, 2022

Far Forward Physics meeting

Very brief report card Nov 1.

Technical and Project development progress.

- Excellent progress on muon rates. New simulations including magnetic fields indicate rate of ~ 0.5 Hz/cm² in the 1mx1m central fiducial region with respect to LOS. LOS includes the movement due to the crossing angle (16 cm).
- Radiation protection has permitted work in FPF during LHC running (except for some areas which will be blocked off).
- Clear ideas on US involvement and scope are being developed. Must keep the scope limited to keep the cost below 413b threshold.
 - Scientific support: Heising Simons to UCI/BNL, LDRD at BNL (new postdoc).
 - Some programatic engineering and R&D support being developed at BNL.
 - US universities; theory support is possible from the DOE/NSF
- Technical progress on detectors and integration
 - Initial conceptual parameters of the facility, and major equipment ready. They will be provided at the FPF5 meeting
 - Integration of the large components: Cryostat/cryogenics, TPC, FASER2 magnet, and facility team is being assembled.
 - Simulations:
 - Simulations that drive fiducial mass, containment, and hadron and muon measurements have progressed.
 - Initial ideas on reconstruction with a TPC in progress.
 - Lot more work needs to be done with focus on different physics topics. A minimum list for CDR under discussion.
- CDR progress (related to FLARE detector)
 - Outline is ready
 - DUNE near detector CDR can be used as a model
 - CDR late May, 2023 ? Is this possible ?
 - The main effort needed is simulations and preliminary engineering modeling (drawings ?)

Some talks/presentations in the near future

- **Searching for long-lived particles at the LHC and beyond: Twelfth workshop of the LLP Community**
 - **Oct 31- Nov 4, 2022. Going on right now <https://indico.cern.ch/event/1166678/timetable/>**
 - **Talks by Felix Kling and Steven Linden on Thursday, Nov 3. (5 pm CERN time)**
- **Physics Beyond Colliders annual meeting**
 - **Nov 7 - 9, CERN <https://indico.cern.ch/event/1137276/>**
 - **Talks by (15-20 min) Nov 8**
 - **Jamie Boyd: FPF facility, preliminary design. site selected, site investigation (core) approved, other engineering studies (shaft, cavern, surface buildings), RP studies, muon flux from FLUKA, Run 3 data, timeline**
 - **Jonathan Feng: FPF physics, ESPP recommendations, Snowmass recommendations, progress on FPF infrastructure and organization (WGs 0-9), then discuss WGs 1-4 and physics reach (examples of quirks for BSM, neutrino studies for SM), upcoming plans**
 - **Milind Diwan: FLARE activities, US support, active meetings, studies, design progress toward CDR, timeline for CDR**
- **5th Forward Physics Facility meeting at CERN**
 - **Nov. 15-16, CERN <https://indico.cern.ch/event/1196506/>**
 - **This meeting will be more focused on project planning.**
 - **FLARE talks are on Nov. 16, however the entire meeting is dedicated to FPF**