

Mu2e-II Radiation Simulation and Mitigation Group Update

Mu2e-II Workshop

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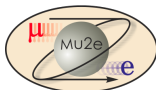
Helmholtz-Zentrum Dresden-Rossendorf

Fermi National Accelerator Labs

August 26, 2020

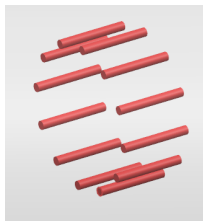


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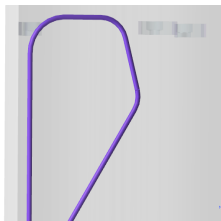


Items for Snowmass 2021 discussion

- **Target Station for pion-production target (LDRD):** Bent conveyor and rotated target options; are there alternative target stations to consider for Mu2e-II (liquid, disk, etc.)?
 - ▶ See [docdb-33926](#) for LDRD progress on Mu2e-II target studies



(a) Rotating target



(b) Conveyor target

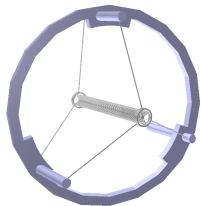
- **Heat and Radiation Shield:** Re-use after Mu2e, superconducting (SC) coil protection?
- **Muon beamline and Detector Solenoid radiation quantities:** DPA, absorbed dose. New levels: due to the increased beampower (and muon flux thereof) radiation damage of SC coils can become an issue (a study is needed)
- **Shielding assessment:**
 - ▶ Prompt dose in habitable premises of the Muon Campus
 - ▶ Residual dose in the PS and DS halls
 - ▶ Prompt dose above PS hatch and DS hatch
 - ▶ Skyshine
- **Activation and replacements of targetry:** Activation of HRS after Mu2e, requirements and levels for personnel access

Current group

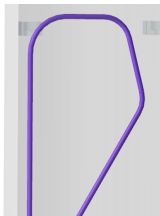
- Michael MacKenzie, Convener (NU)
- Stefan Mueller, Convener (HZDR)
- Vitaly Pronskikh, Convener (FNAL)
- Anna Ferrari (HZDR)
- Reuven Rachamin (HZDR)

Current status

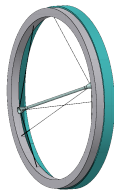
- Utilizing multiple MC to perform radiation studies: Offline/Geant4 (MM), G4Beamline (VP), MARS15 (VP), FLUKA (SM, AF), and MCNP6 (RR)
- Beginning to implement initial production target designs, will also pass these on to the Sensitivity Estimate working group
- Beginning radiation simulations with an 800 MeV proton beam in MARS15, FLUKA, and MCNP6 (Geant4 studies to come soon)



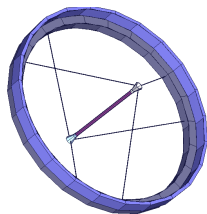
(a) Current Offline target



(b) Example MARS15 target



(c) Initial FLUKA target



(d) Initial MCNP6 target

- Asked for liaisons appointed within sub-detector and sensitivity estimate working groups, as radiation effects are critical to evaluating the feasibility and the design of other detector components

Backup slides