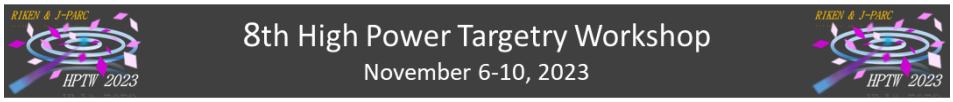

Contribution ID: **133** Type: **Invited Oral**

High Power Target R&D needs for muon colliders

Tuesday, 7 November 2023 15:30 (30 minutes)

The Muon Collider will serve as the discovery machine for various mysteries raised in the modern physics, while also facilitating collider experiments for the beyond standard model. The high power target system will be the central part of the collider. The performance of the system will determine the deliverable collider beam parameters, like a luminosity and collision energy. Therefore, making a strategic plan for high power target R&D is an important milestone. Our approach for the R&D is following three items:
Material Discovery: The first part of our R&D initiative on identifying a material which is enough to withstand the intense, short-bunched proton beams. The designed proton beam is the energy range of 5-20 GeV, an RMS bunch length of 1-2 ns, intensity per bunch from 1014 to 1015, and repetition rate of 5-10 Hz. RaDIATE is an international collaboration, which has been established to address the material challenge.
Optimizing Muon Yield: The second aspect involves optimizing the target system to maximize muon production in the system. Collaborative efforts between the International Muon Collider Collaboration (IMCC) hosted by CERN and the US Muon Collider design groups are the central body in designing an efficient target system. It also includes experimental efforts, like proposing the yield measurement by using an existing technologies such as EMPHATIC and NA61/SHINE spectrometers which are used for neutrino oscillation measurements.
Integration: The final piece of the plan lies in the integration of the system. The infrastructure and remote handling systems play a critical role in the maintenance and operation of the target system. The beam instrumentations for diagnose the target and assure the quality of muon beams are also included.

In my presentation, I will provide an overview of the muon collider target R&D including the Accelerator Complex Evolution (ACE) plan at Fermilab. I will also highlight each item.

Themes for the contribution

1 R&D to support concepts

Primary author: YONEHARA, Katsuya (Fermilab)

Presenter: YONEHARA, Katsuya (Fermilab)

Session Classification: Topic1-1