



Contribution ID: 1314 Contribution code: TUPM077

Type: **Poster Presentation**

## **New developments in the design of the muon production target area of a multi-TeV muon collider**

*Tuesday 3 June 2025 16:00 (2 hours)*

As the International Muon Collider Collaboration advances the conceptual design for a multi-TeV muon collider facility, new technical constraints continue to arise in the muon production stage, where a high-power proton beam interacts with a target. Achieving the required muon bunch intensity may necessitate increasing the primary beam power up to 4 MW. Consequently, the shielding design must address sustained radiation exposure, particularly on critical components such as superconducting solenoids, which generate strong magnetic fields essential for capturing both pions and decay muons. Additionally, the portion of the proton beam that passes through the target without undergoing inelastic interaction leads to a very high power density in the chicane area and an intense ionising dose on the insulation material of the normal-conducting chicane magnets, which are used to separate the muon component. A robust method to safely extract these spent protons is crucial. This study presents the latest results from FLUKA Monte Carlo simulations, modelling the radiation load on solenoids and the extraction channel across varying beam power and target designs.

### **Footnotes**

### **Paper preparation format**

LaTeX

### **Region represented**

Europe

### **Funding Agency**

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**Session Classification:** Tuesday Poster Session

**Track Classification:** MC3: Novel Particle Sources and Acceleration Techniques: MC3.A09 Muon Accelerators, Neutrino Factories, Muon Colliders