

International
Muon Collider
Collaboration

Summary of Target System session

1st Muon Community Meeting, 20-21 May 2021



by Marco CALVIANI
CERN – Systems Department
Sources Targets Interaction (STI)
Targets Collimators Dumps (TCD)

Prioritisation discussion

Production solenoid

- **Highest priority!**
 - Radiation damage on conductor → separate testing possible
 - Quench limits
 - Magnet engineering issues (feasibility vs. cost)
 - Coil protection vs. shielding vs. bore diameter
- Horn(s) backup is to be foreseen
 - Believe that technically feasible, so lower priority should be given to this item – multiple target/horn systems

Prioritisation discussion

Target Systems (1/2)

- Graphite
 - Workhorse for Targetry and beam intercepting device
 - Possible solution if beam power up to 1.5/2 MW max
- Packed bed target (also an option for ± 2 MW)
- Fluidised tungsten
 - Advanced design, additional offline testing to validate technology
- Liquid metal technologies (pure, eutectics, etc.)
 - Technologies developed already for nuclear industry
 - “Paperwork” + offline testing to be foreseen to validate technology specific to MUC
- Hg target to be considered excluded (at least for a CERN implementation)

Prioritisation discussion

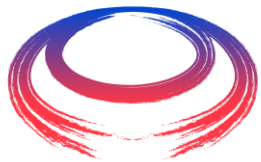
Target Systems (2/2)

- Integration/design of the main beam dump is an important item that must be validated and cross-checked in detail, even with respect to the capture magnets
- Focusing most likely be different depending on whether a 2 MW or 4 MW beam is considered
- Thermal shock on target material critical
- Current accelerator plan for MUC based on 2 ns proton bunch and 5 Hz rep. rate – does it improves for Targetry if rep. rate is increased with less bunch intensity?
 - What is effect on luminosity for the final collider?

Prioritisation discussion

Target Station

- High level concept of the MUC Target Station required for feasibility and cost estimate
- Target system integration (target/magnets/dumps) and target complex design
- High level RP assessment
- Sectorisation confinement of highly radioactive zone should end maximum at the chicane, before cooling section



International
UON Collider
Collaboration



*Thank you
very much for your support
and for your attention*