



Mechanical Validation Tests on the TRIUMF Demonstrator

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Beam Intercepting Devices – Typical Lifecycle

- Operational reliability
- Maintainability
- ALARA design
- QC/QA on whole process
- BMI & FEA analyses
- Continuous comparison with experimental data



Pre-requirements for prototyping

➤ **Clear functional specifications of final device**

- Main function to be fulfilled by device
- Boundary conditions
- Environmental constraints

➤ **Conceptual design**

- Optics calculations
- Energy deposition (BMI)
- Engineering calculations (thermal, structural, electro-magnetics)

➤ **Specifications of demonstrator**

- Main objectives
- Expected challenges
- Technical design
- Calculations (expected performance)

Project Plan for Demonstrator

- **Definition of tasks**
- **Objectives**
- **Strategy**
- **Schedule**
- **Budget**
- **Responsibilities – WHO DOES WHAT ?**
- **Qualification tests**

Production of Demonstrator

Follow-up to understand challenges during production

Intermediate tests

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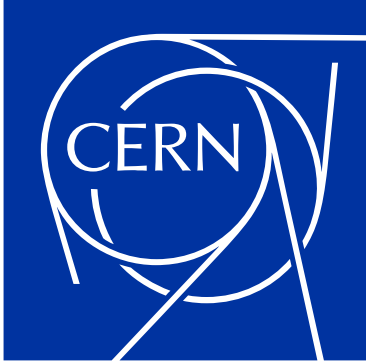
Qualification of Demonstrator

- **UHV compliance (EDMS XXX)**
 - Outgassing tests
- **Impedance design and considerations**
 - Electro-magnetic characterisation – impedance measurements
- **Thermal-structural behaviour**
 - Heat load (power)
 - Temperature distribution
 - Structural behaviour (e.g. deformations under thermal loads)
 - Power dissipation (cooling efficiency)
- **Mechanism performance**
 - Motion robustness
 - Repeatability

Examples of Tests – Collimator Jaw TCC

Examples of Tests – TIDVG#5 Heat-Sink

Conclusions



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