MERIT Beam Collimator Design

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Collimator Role

- Beam of \(~30 \times 10^{12}\) protons per pulse, integrated power of \(~140\text{kW}\)
- Align the proton beam with the mercury target
- Prevent proton beam from hitting and damaging experiment equipment
Requirement Specifications

- Nominal position at beam height of 120cm above concrete floor
- Located 2m upstream of magnet – must be non-magnetic material
- Length of 1m
- Collimator block area of at least 150mm x 150mm
Proposed Design

- All requirement specs are met
- Collimator block area of 160mm x 160mm
- Hole radius of 20mm
- Lateral movement (x and y axes) of +30mm, longitudinal movement (z axis) of +55mm; manually adjustable
- Uses CERN standard parts wherever possible
Additional Information

- Target dimensions confirmed

- Collimator insert
  - Needs to be exchangeable (e.g. for different sized aperture)
  - Material is tungsten

- Need drawings of CERN standard parts for alignment

- Calculations for energy deposited by beam