LHC Collimator - Test Case

**FLUKA Model**

Dimensions : 20 x 100 x 1500 mm³;
Material : Carbon (1.77 g/cm³);
           Be       (1.85 g/cm³);

Beam parameters: 7 TeV protons, σ = 0.3 mm,
intensity: nominal 1.05x10^{11}; ultimate: 1.7x10^{11}
15 bunches spaced 0.1 mm
Beryllium Properties

- Young's Modulus: $E_{\text{dyn}}$ [GPa]
- Yield Stress: $\sigma_t$ [MPa]
- Thermal Conductivity: $K$ [W/m°C]
- Heat Capacity: $C_p$ [kJ/kg°C]
- Thermal Expansion Coefficient: $\alpha$ [μm/m°C]

Graph showing the variation of Young's Modulus, Yield Stress, and other properties with temperature.
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Longitudinal profile of the absorbed energy

Absorbed energy [MJ/kg] vs. z [cm] for Carbon Collimator, Ultimate, and Nominal cases.
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Longitudinal temperature profile

The graph shows the temperature profile along the z-axis for different conditions.

- **Carbon Collimator**
- **Ultimate**
- **Nominal**

The y-axis represents Temperature [°C], and the x-axis represents z [cm]. The graph illustrates the variation of temperature with z for the three conditions.
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Longitudinal temperature profile

Temperature [°C] vs. z [cm]

- **Carbon**
- **Beryllium**

Nominal Intensity