

Long-lived Stau

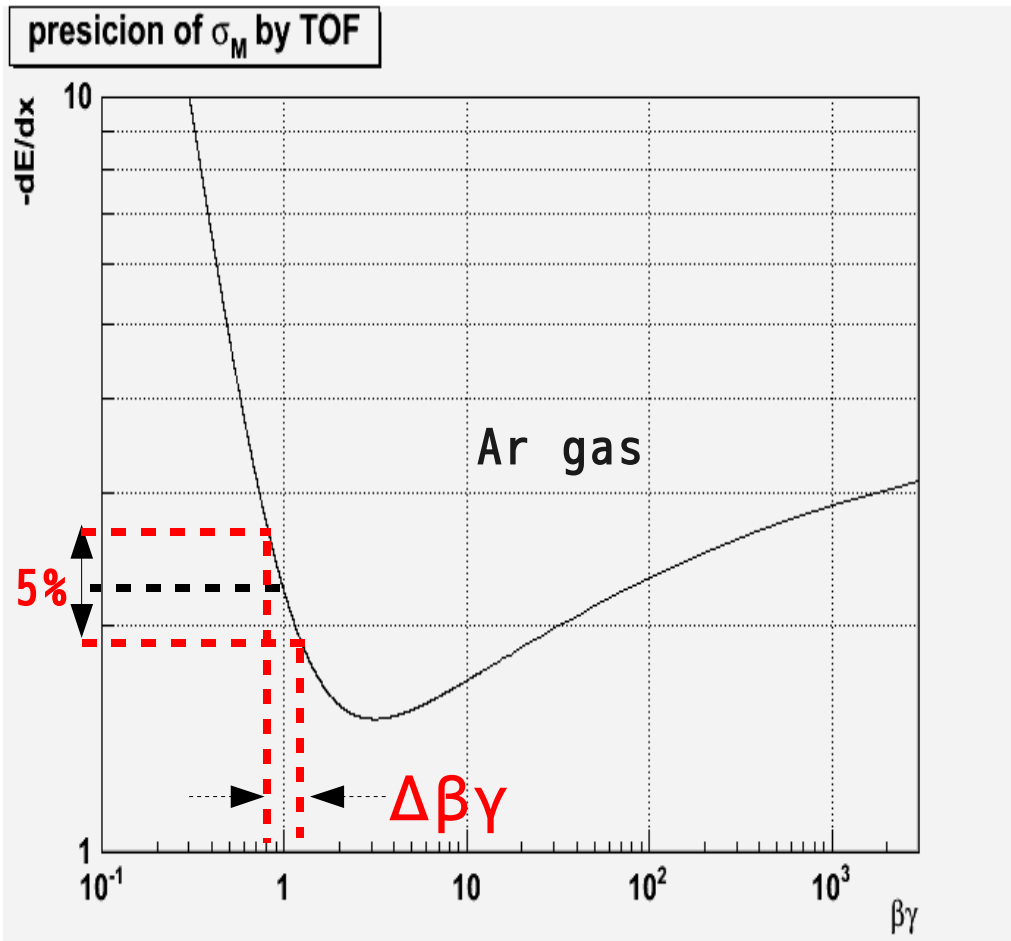
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Outline

- About measurement of stau mass from dE/dx at TPC
- About precision of life time measurement at HCAL

dE/dx



$$\beta\gamma = \frac{p}{M}$$

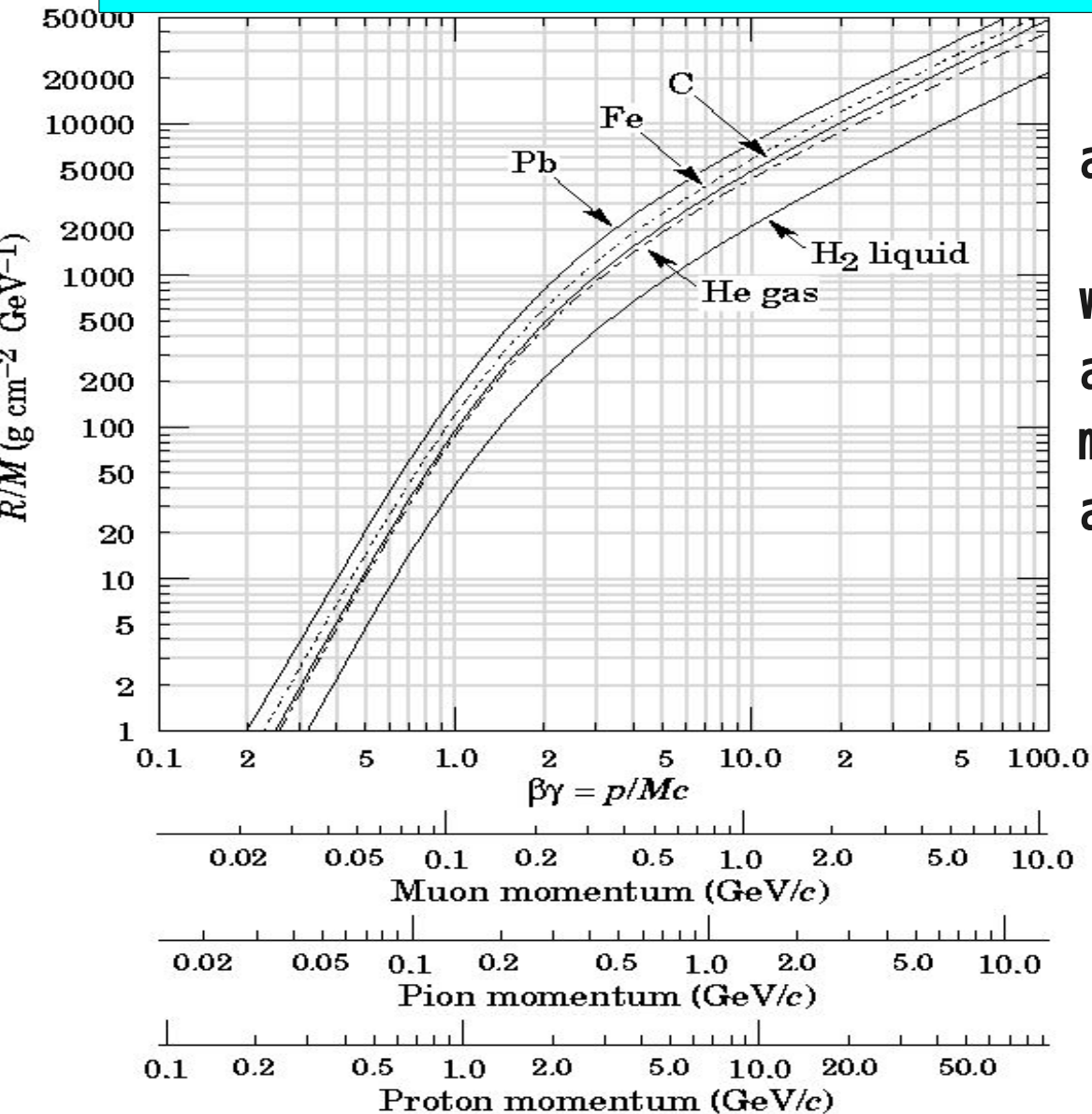
$$p = \sqrt{E^2 - M^2} \quad E = \frac{\sqrt{s}}{2}$$

$$M = \frac{\sqrt{s}}{2} \cdot \sqrt{1 - \beta^2}$$

$$\sigma_M = \frac{\sqrt{s}}{2} \cdot \sqrt{\frac{\beta^2}{1 - \beta^2}} \cdot (\Delta\beta)$$

\sqrt{s} を横軸に、 $\sigma_{dE/dx}$ を縦軸にとる $\longrightarrow \sigma_{dE/dx} = \frac{\sigma_M}{\sqrt{L \cdot \sigma}}$ \longleftarrow Cross section

Life time



Life time is measured at HCAL.

Calculate beam energy when particle stops in HCAL and precision of life time measurement by luminosity and cross section.

$$\frac{\sigma_{\tau}}{\bar{\tau}} = \frac{1}{\sqrt{L \cdot \sigma}}$$

HCAL :48 steel plates
thickness 20mm

R=960mm

Plan

- Calculate dE/dx , and precision of mass measurement.
- Calculate τ when stopping stau in HCAL, and precision of decay time measurement.
- MC simulation