Proton Beam Spot Size

MERIT EVO Meeting

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Beam envelope (1-sigma) - ε=0.25 (mm.mrad), Dp=0.1%

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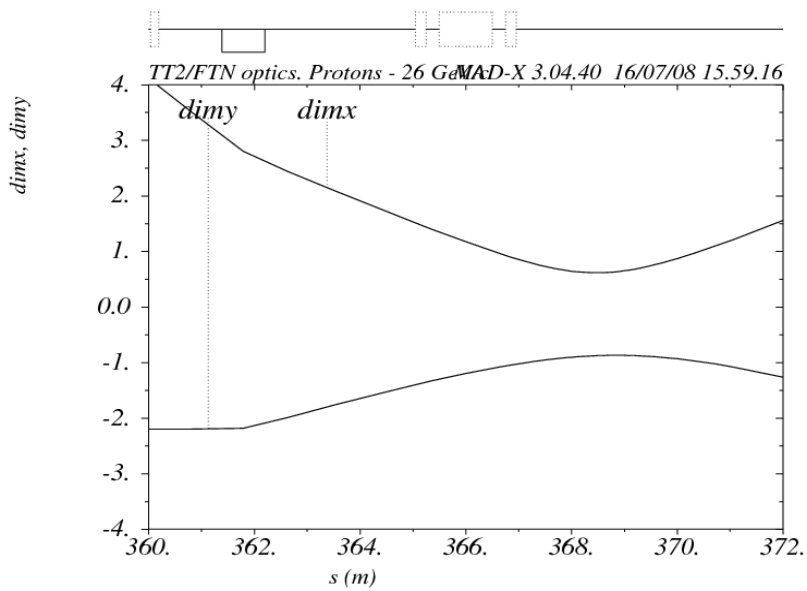
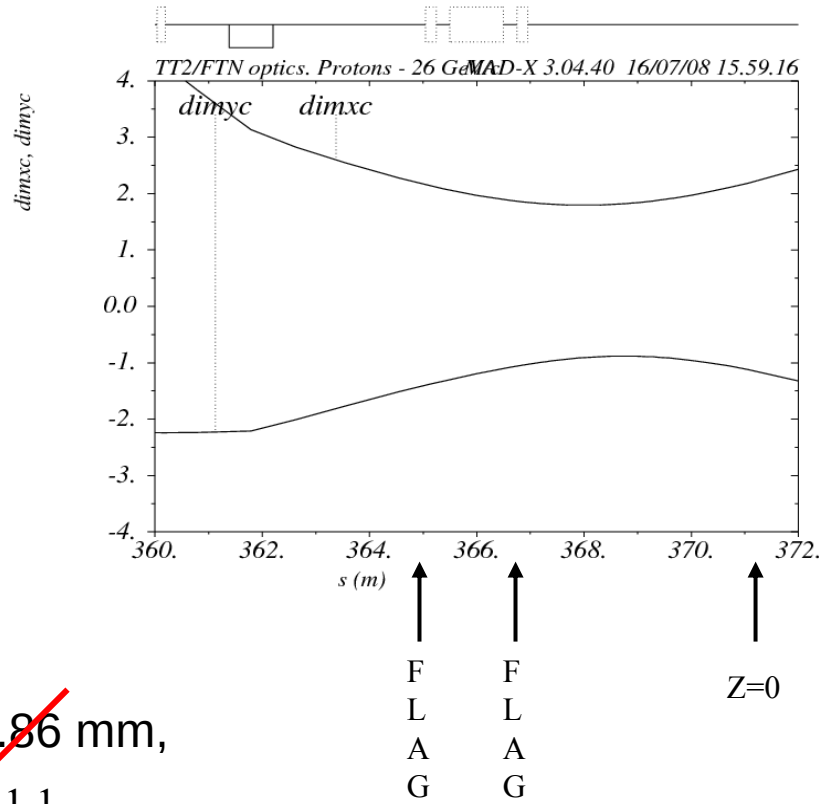
Without dispersion term



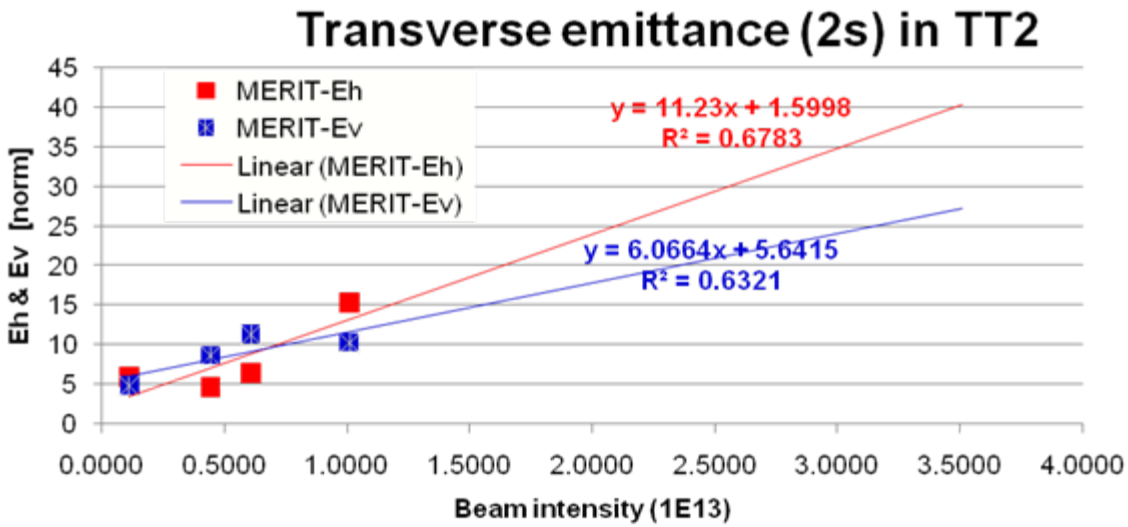
With dispersion term



- σ(x) = 2.2mm , σ(y) = ~~0.86~~ 1.1 mm,

Emittance measurements

Use the data to extrapolate at higher intensities



For 10Tp the 2σ Normalized emittances are:

ε_h = 12.8 mm-mrad ε_v = 11.7 mm-mrad

For a 24 GeV proton beam $\beta\gamma = 26.57$

→ 1σ geometric emittances are: ε_h = 0.12 mm-mrad ε_v = 0.11 mm-mrad

Spot Size at Z=0

Predicted 1σ beam spot size at Z=0 for 24 GeV, 10Tp proton beam is:

$$\sigma(x) = 1.5\text{mm} \ , \ \sigma(y) = 0.73 \text{ mm},$$