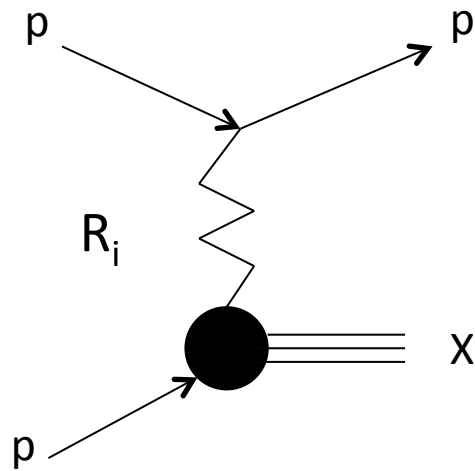# Updated scattering physics for collimation simulations

- Rob, on behalf of the team
- 15/11/13, Collimation simulation mini-workshop

- Elastic
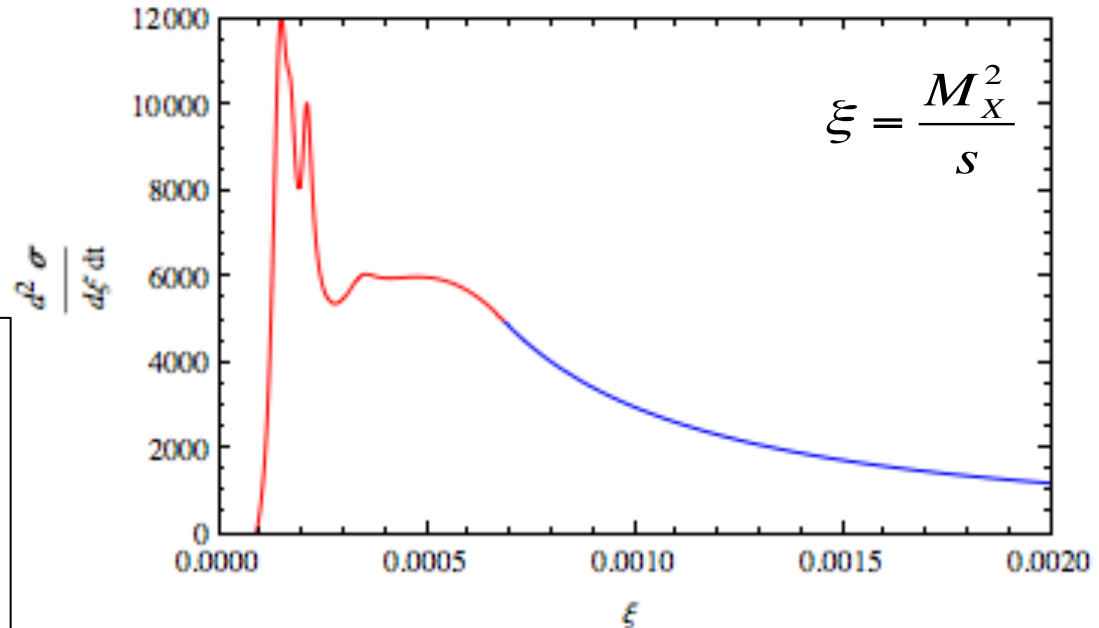- Single diffractive

Improved Single Diffractive Scattering (Preliminary results)
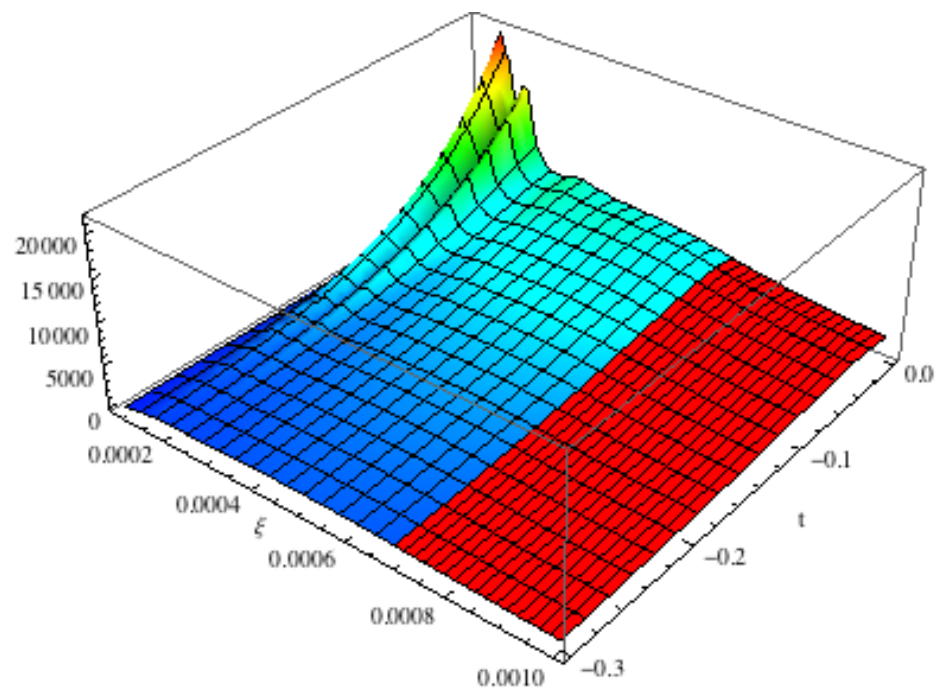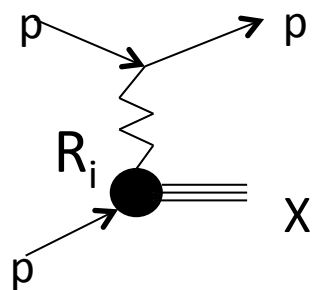
p   p

R_i

X

p

The main idea is to model the single diffraction and elastic scattering with the Regge theory and get the parameters of the model from a <u>fit from all the existing data</u> for p-p and p-pbar scattering.

$$\xi = \frac{M_X^2}{s}$$

Sixtrack SD function:

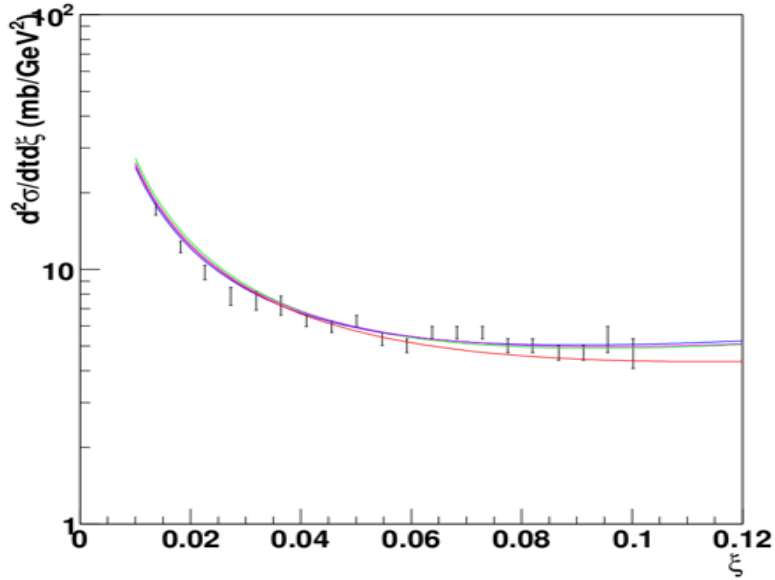$$\frac{d^2\sigma}{dM_X^2\,dt} \propto \frac{e^{-b(M_X)t}}{M_X^2}$$

In the plot is shown the double differential cross section for the exchanged momentum t = - 0.05. The blue line is the fit of the Regge model and the red one is the contribution from the resonances at low missing mass Mx.
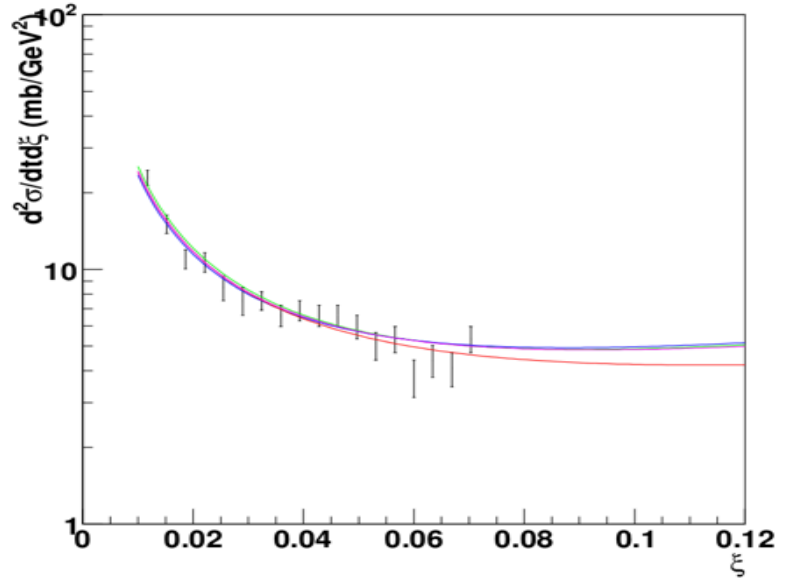
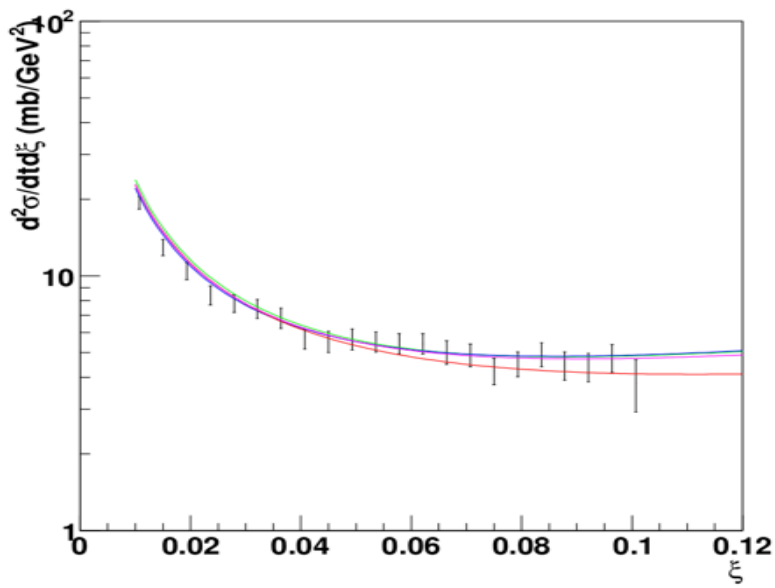The fit of the Regge model in red and the contribution from the resonances at low missing mass Mx in blue
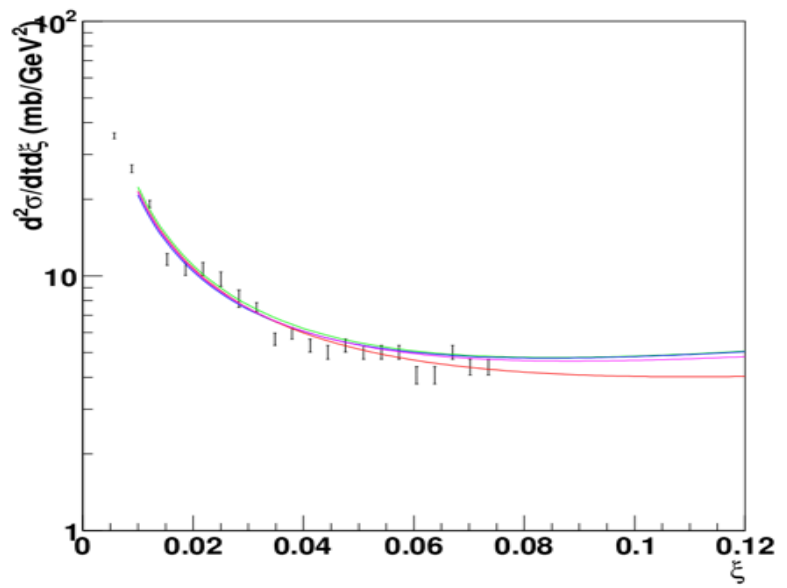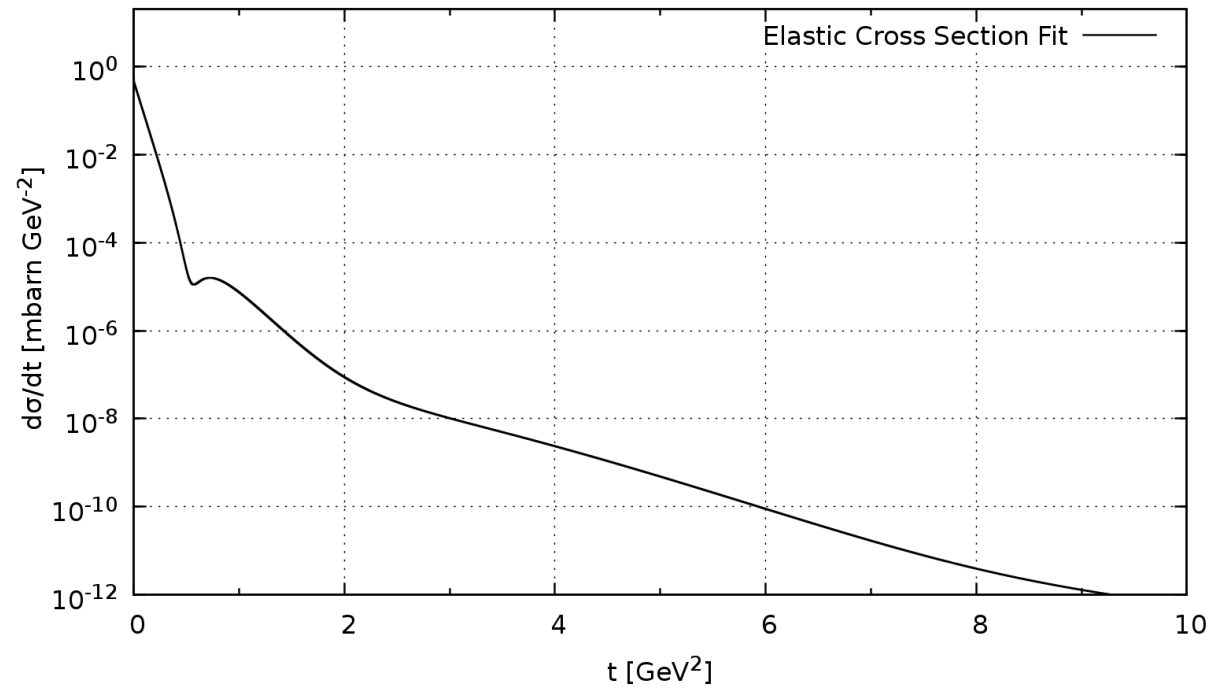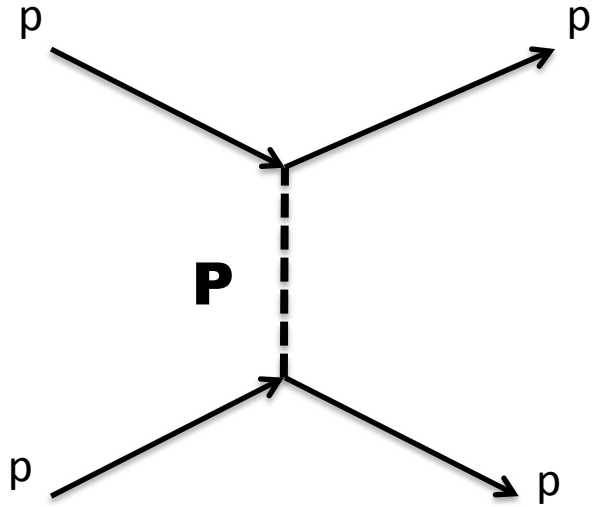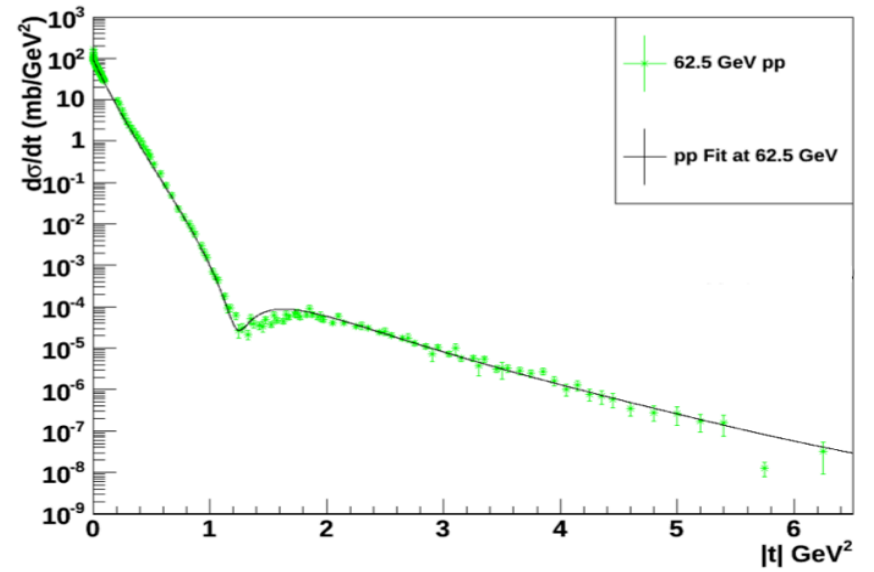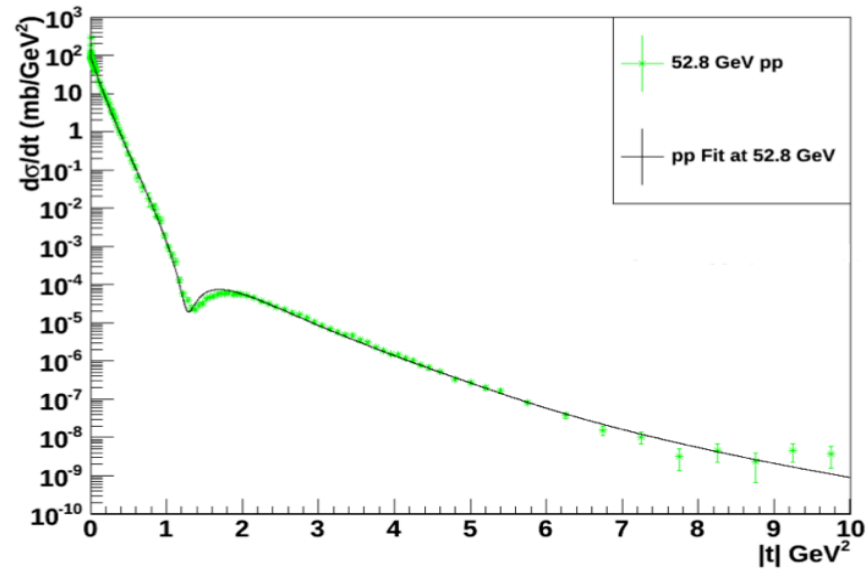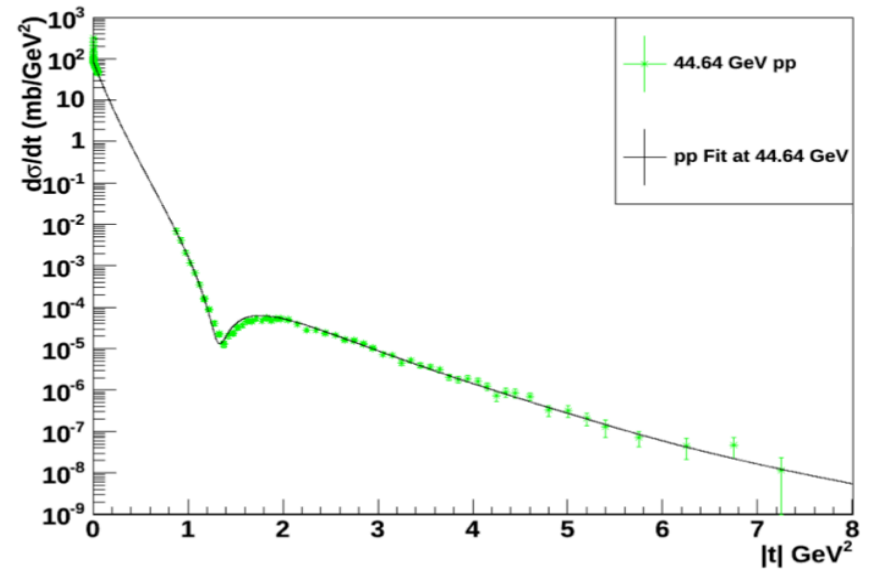
t = -0.55 s = 549

t = -0.55 s = 725

t = -0.55 s = 934
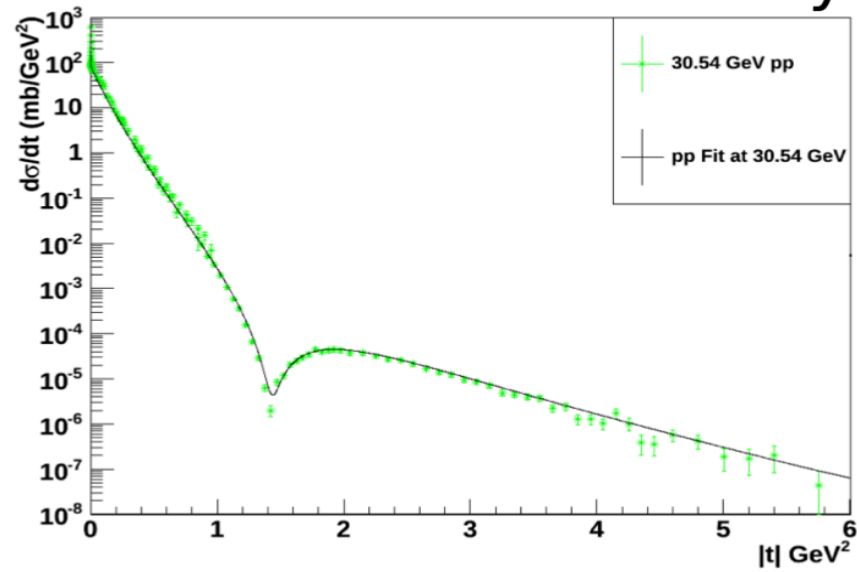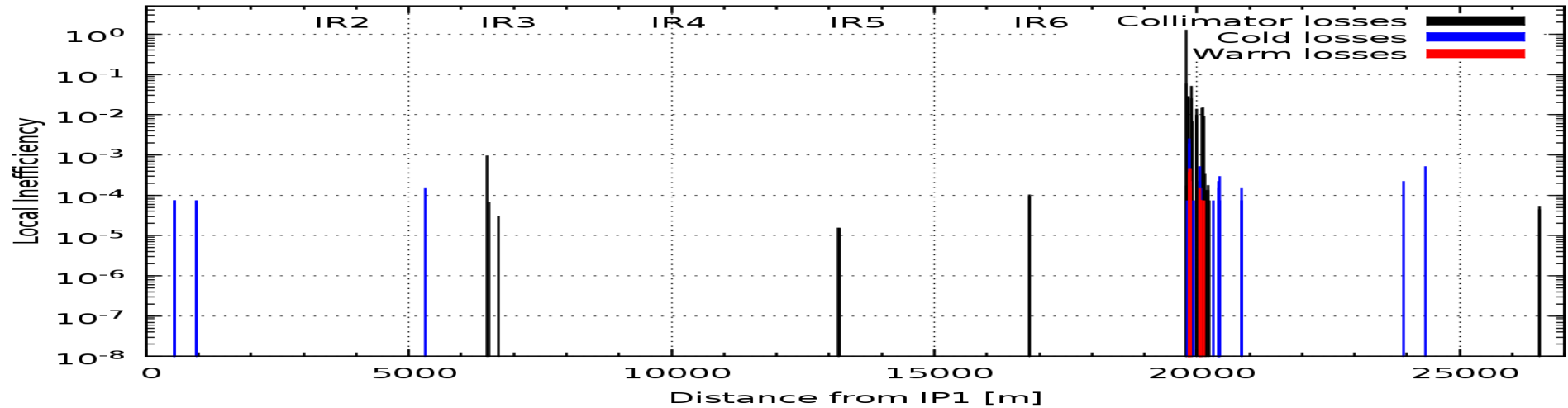
t = -0.55 s = 1239

Improved Elastic Scattering Routine (Preliminary results)

Preliminary Results

Preliminary loss maps

Loss map for standard optics at 7TeV:

- First attempt with the improved scattering routine
- 2e5 protons simulated
- Collimator inef unchanged
- Some differences (redistributions) for warm and cold losses, arising from SD differences
- Analysis on-going