

100TeV pp beam beam elastic interactions

J. Molson

17 March, 2016

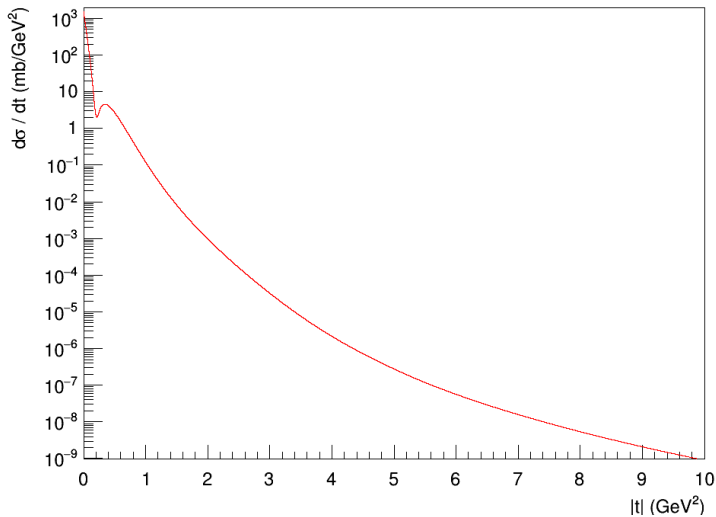
Beam beam elastic proton scattering

- When two proton beams collide, protons can interact elastically.
- Protons will have the same energy, but will be kicked to a new angle in their trajectory.
- This will lead to emittance grow or beam loss.
- How bad is this for the FCC?
- First need to know the proton-proton elastic scattering differential cross section at $\sqrt{s} = 100 \text{ TeV}$.

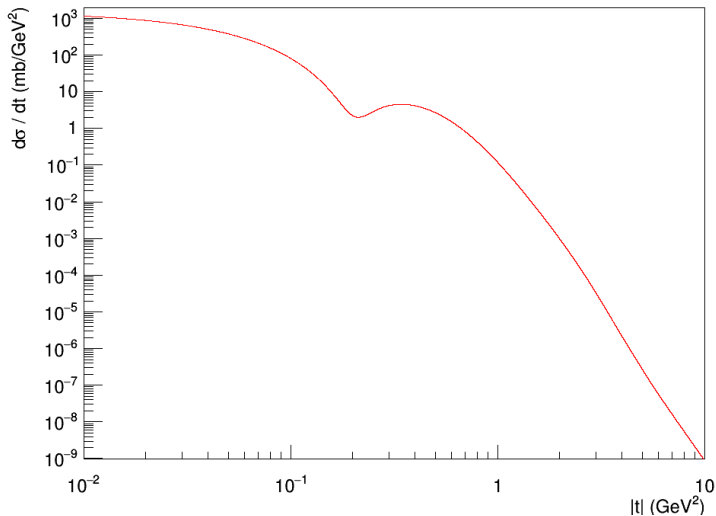
Disclaimer

- No data currently exists at 100TeV.
- Many different models exist - cannot be certain which is correct.
- We have to build models using existing data and extrapolate.
- This extrapolation can be quite large, and small changes in model parameters can lead to large variations at 100TeV.
- The following is a guideline only.
- Was only asked to perform this calculation yesterday (could contain some simple mistakes).

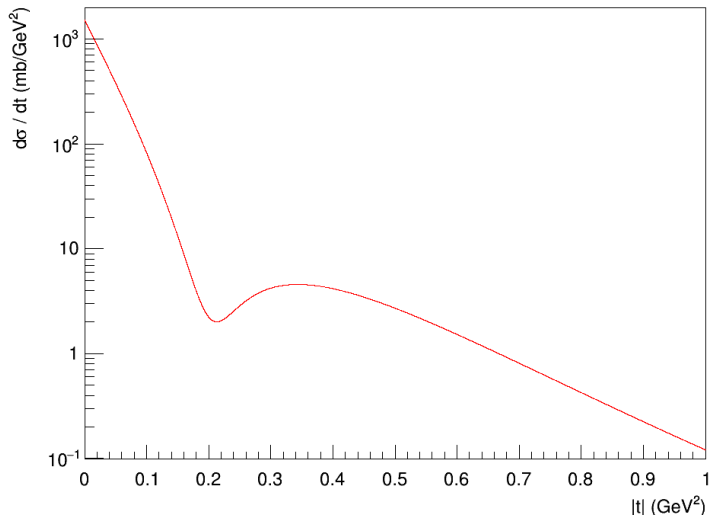
Differential cross section - $t < 10$



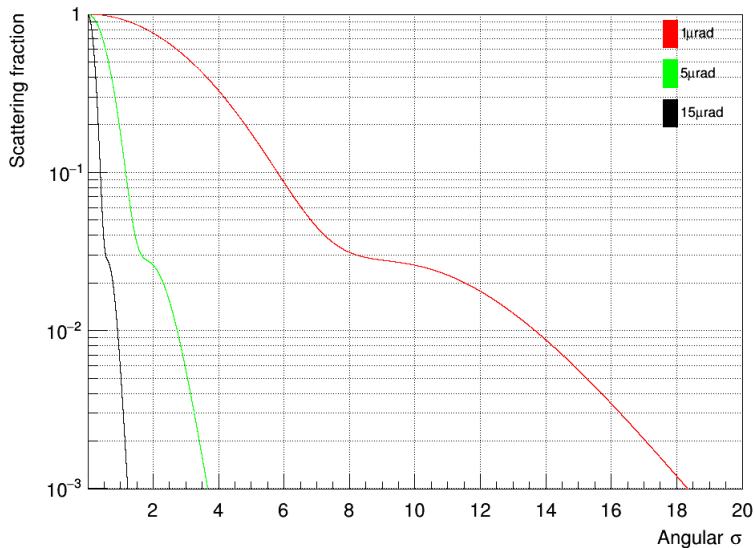
Differential cross section - $t < 10$ (log t)



Differential cross section - lower t



Summed cross section



Summed cross section (log sigma)

