

# Charged Particle Reconstruction at the Muon Collider

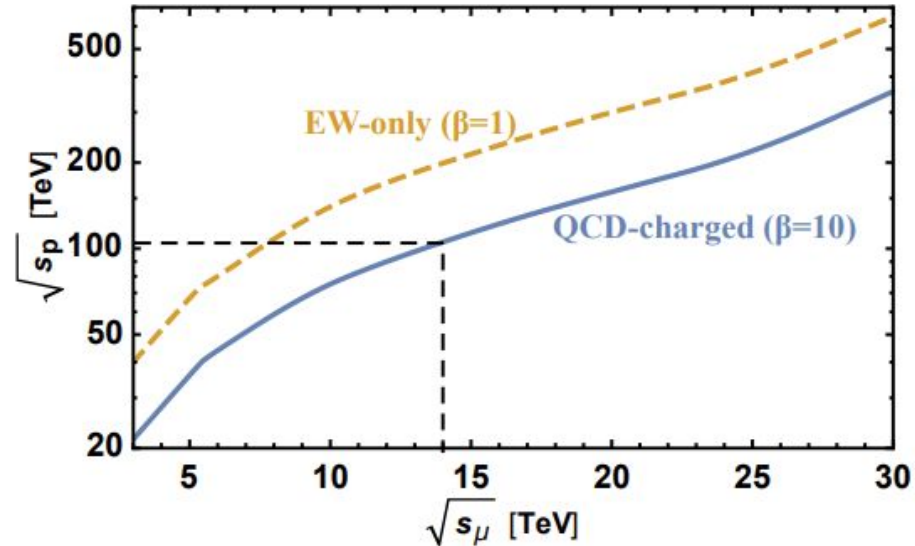
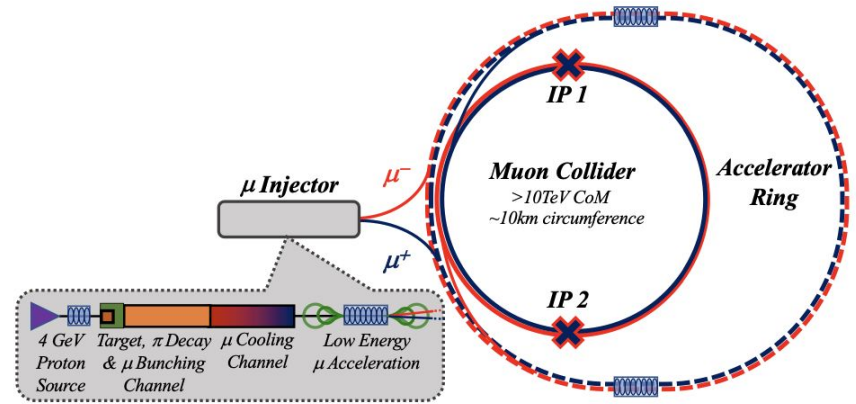
Samuel Ferraro (samuel\_ferraro@brown.edu)



BROWN

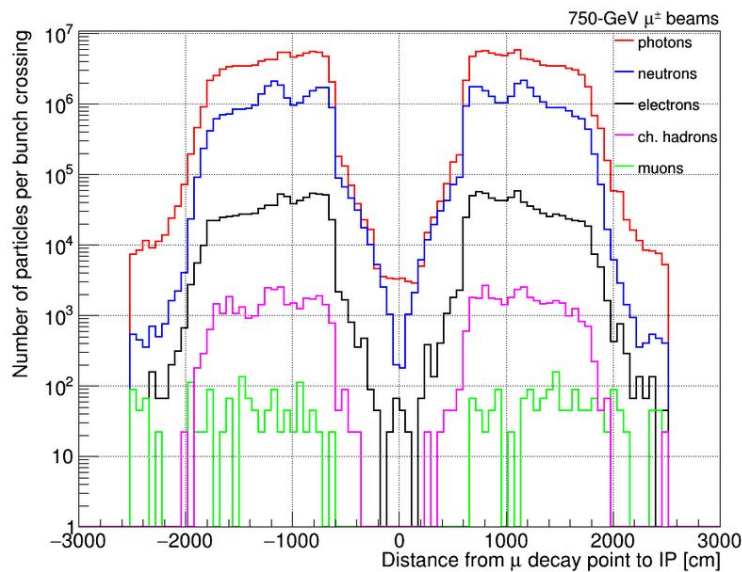
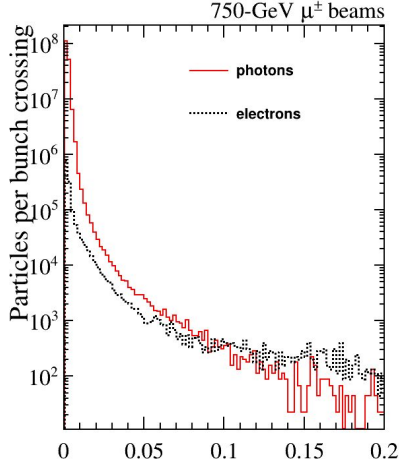
# Why a Muon Collider?

- In 2023, the P5 report suggested a Muon Collider as one of the best options to push the energy frontier
- Elementary Particles – All energy goes into collision
- Higher mass than electrons – Less synchrotron radiation
- High energy muon collisions create an abundance of effective vector bosons – sensitive to Higgs



# Beam Induced Background (BIB)

- As unstable particles, muons decay.
- Millions of low energy particles intersecting with the detector
  - Photons
  - Electrons/Positrons
  - Neutrons
  - Charged hadrons



# Charged Reconstruction Algorithm and Key4HEP

- To combat the BIB, the reconstruction algorithms need to be fast and efficient.
- The new Key4HEP software framework allows for powerful parallelization.
- Reconstruction Algorithms need to be moved to Key4HEP (GAUDI) and parallelized in the new framework.

