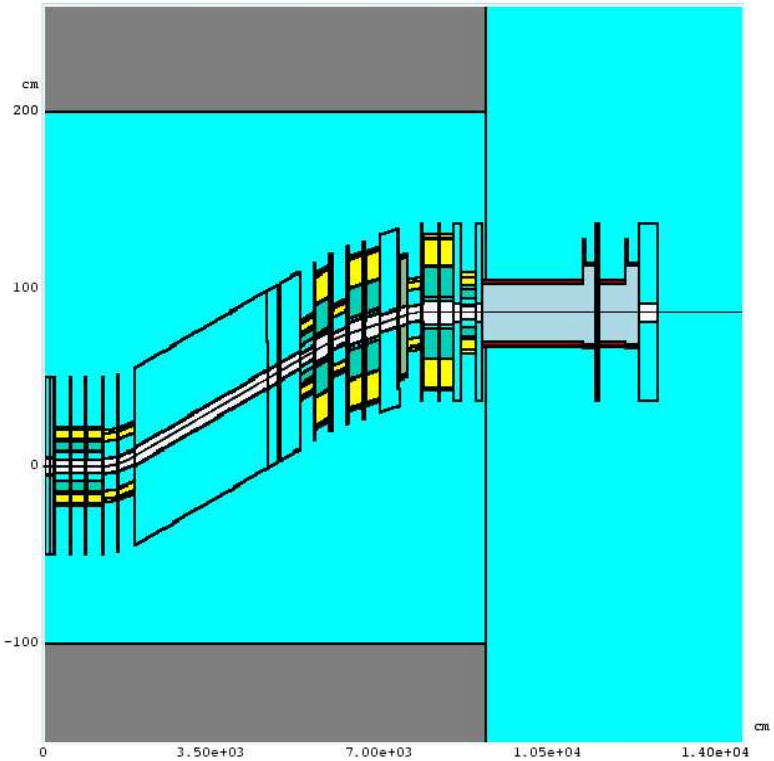
Beamline calculations with MARS

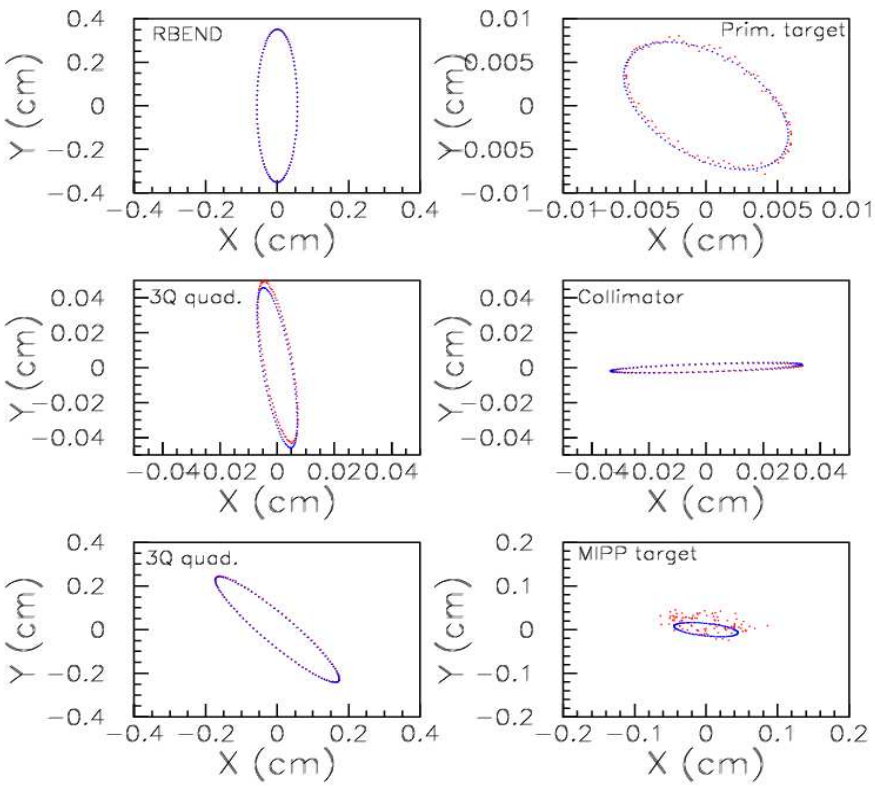
Mikhail Kostin

Model consistency

Reference orbit

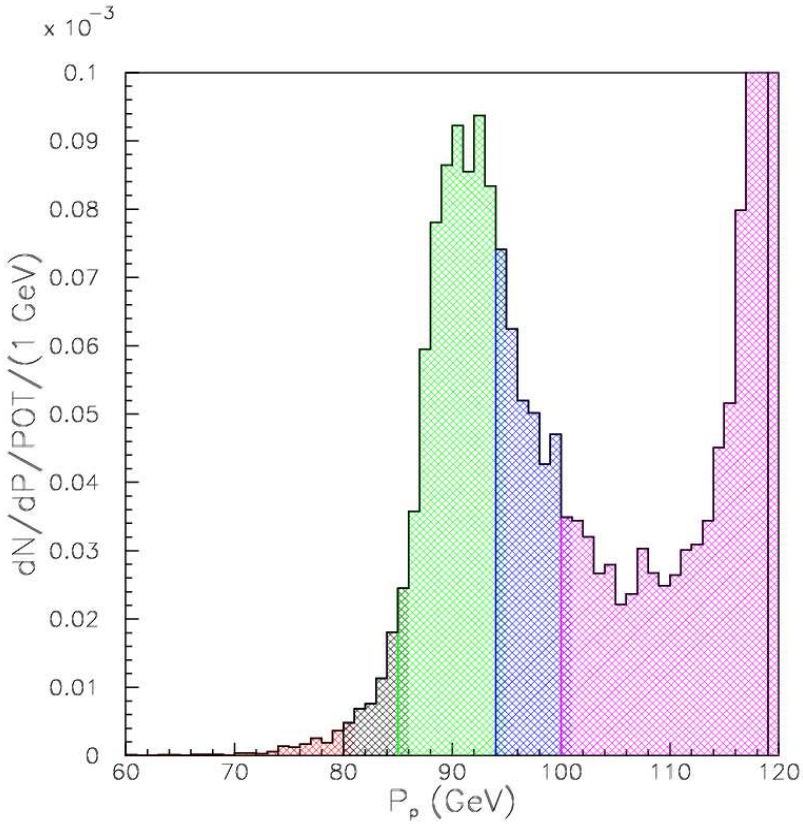


Consistency with STRUCT (matrix formalism)

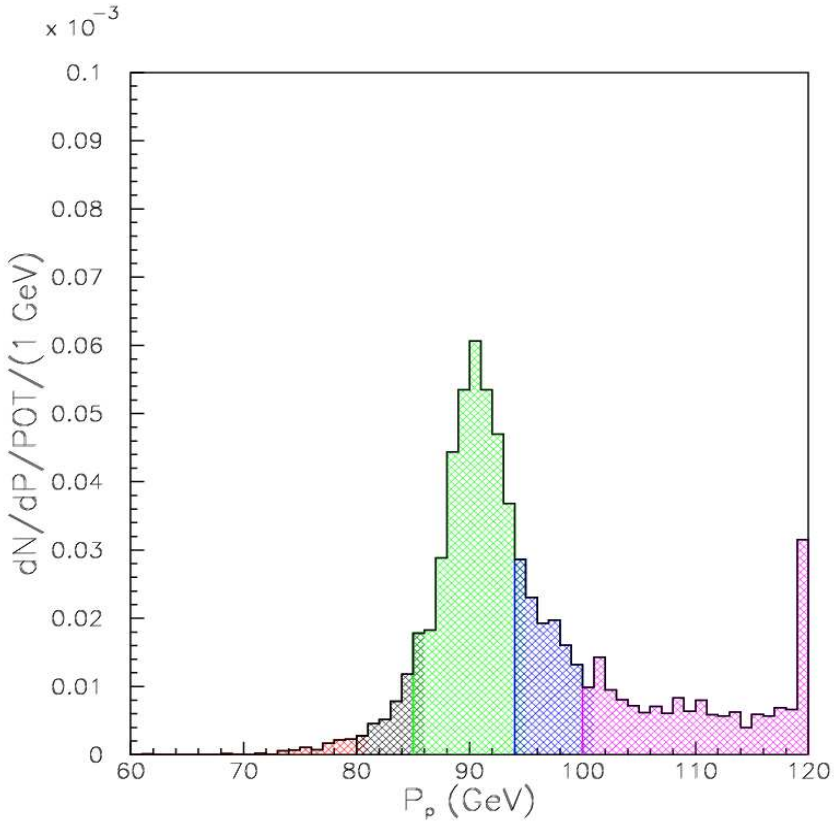


Momentum distributions, no cuts

Old

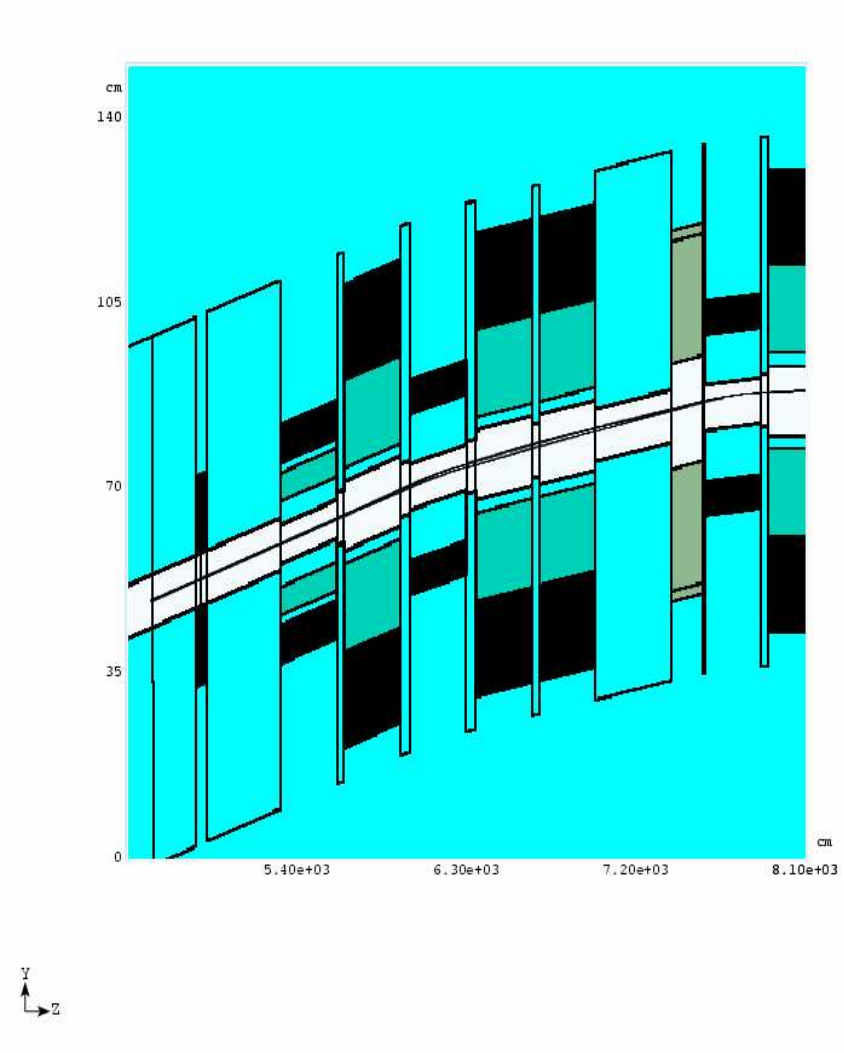


New

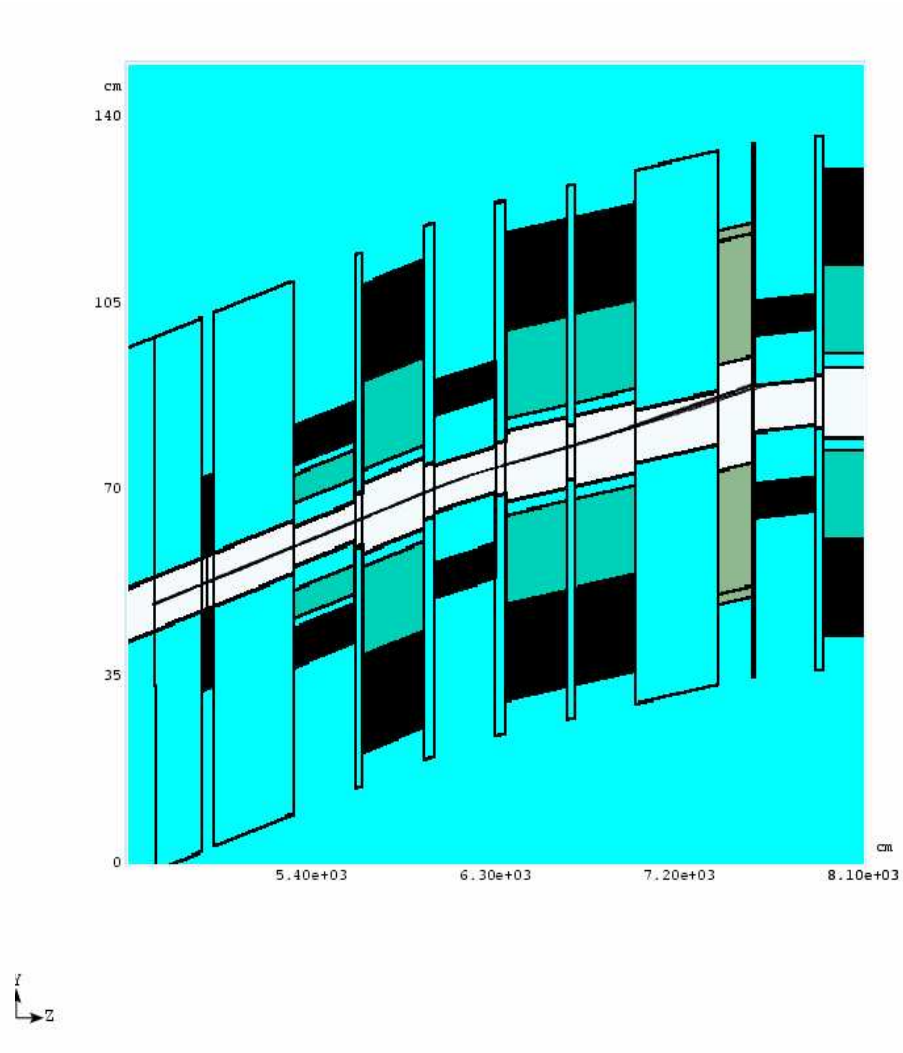


Initial 120 GeV protons in 90 GeV beamline

Old design

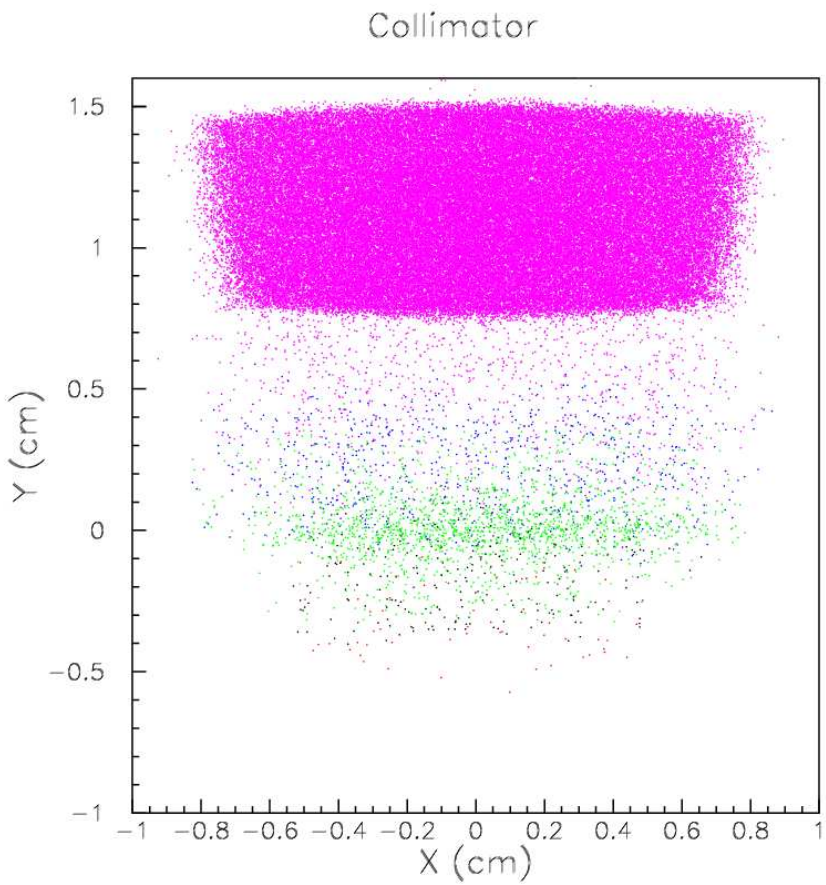


New design

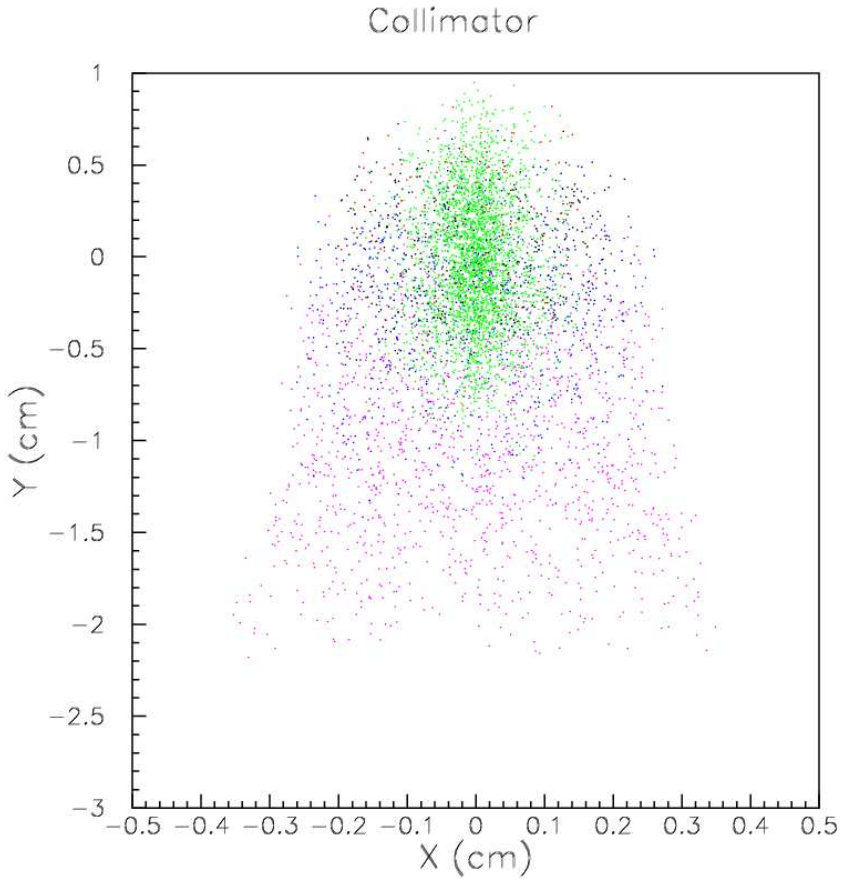


Beam profiles at collimator, no cuts

Old

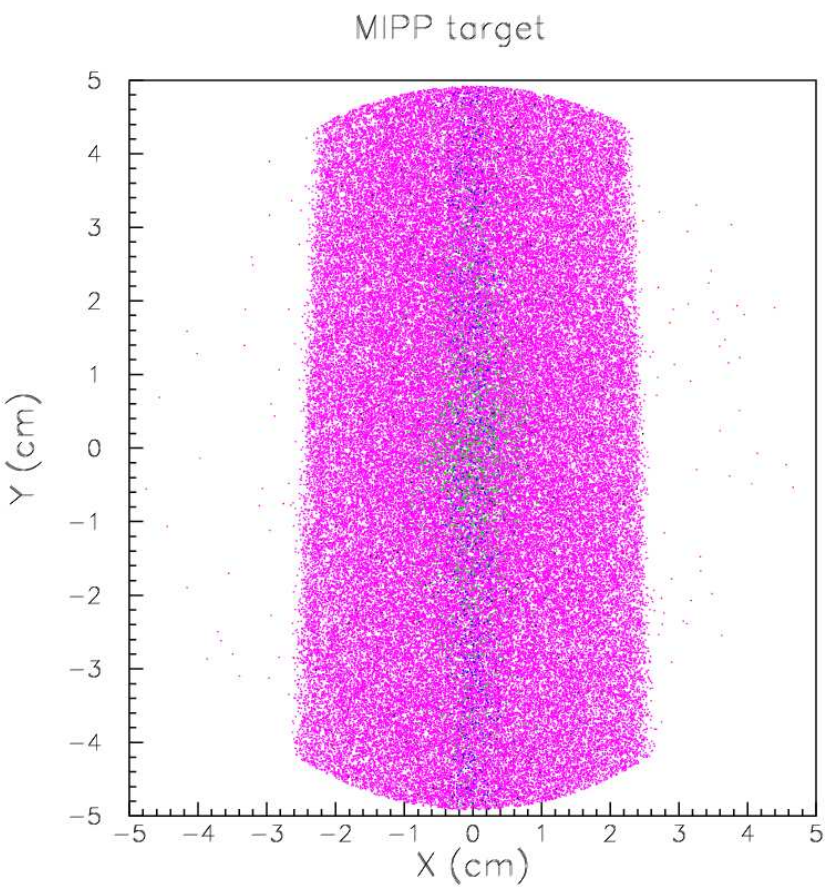


New

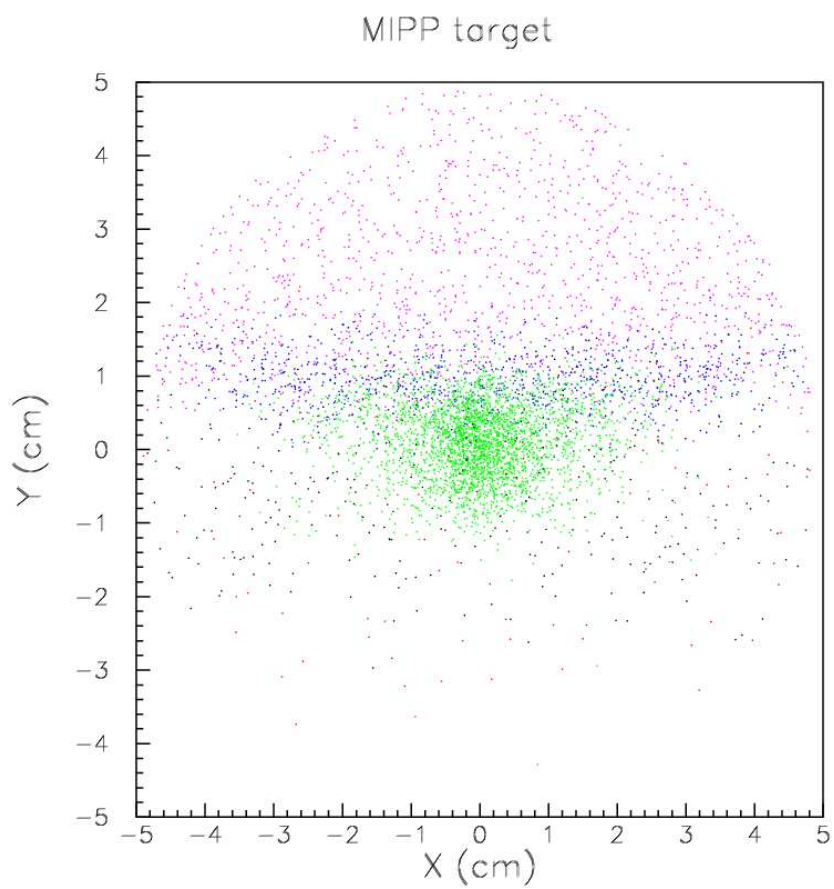


Beam profiles at MIPP target, no cuts

Old

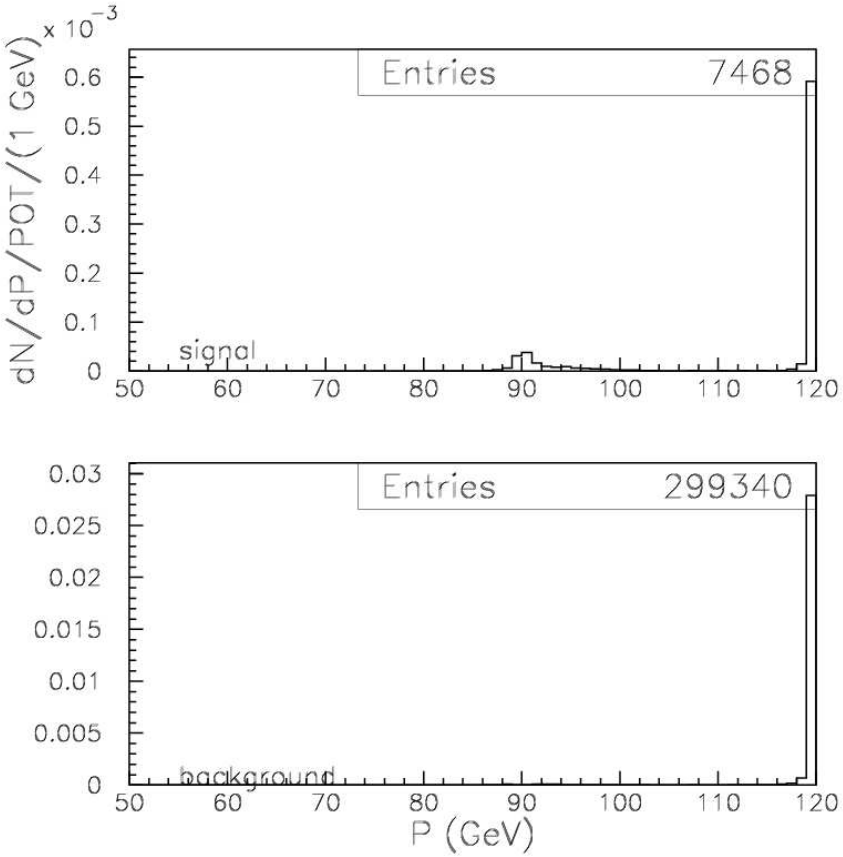


New

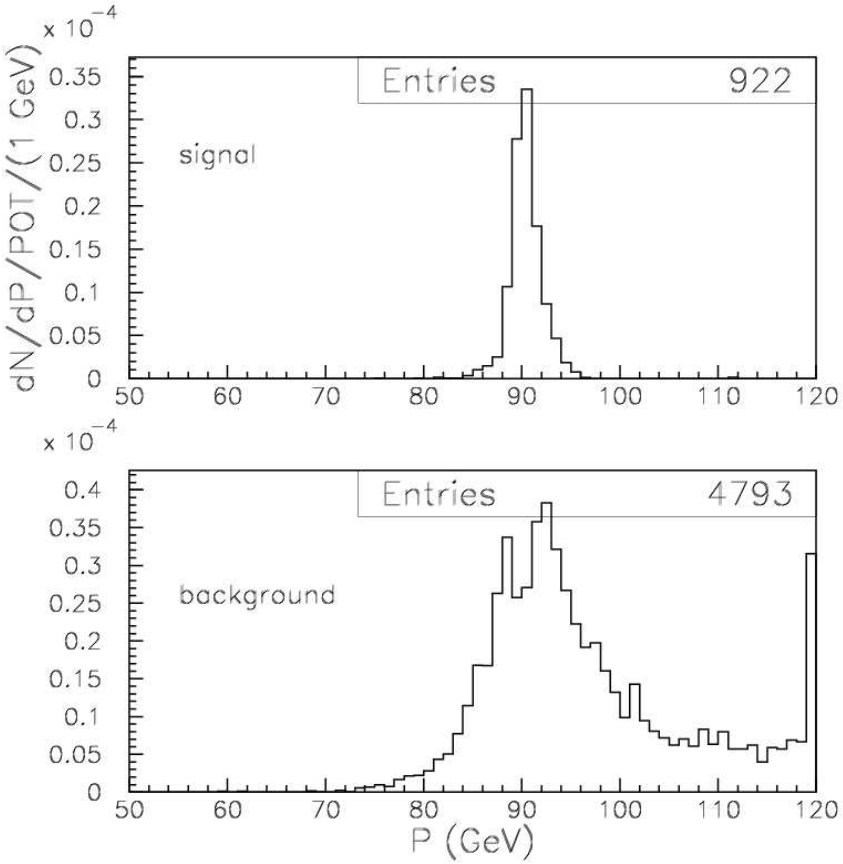


Signal and background, no cuts

Old

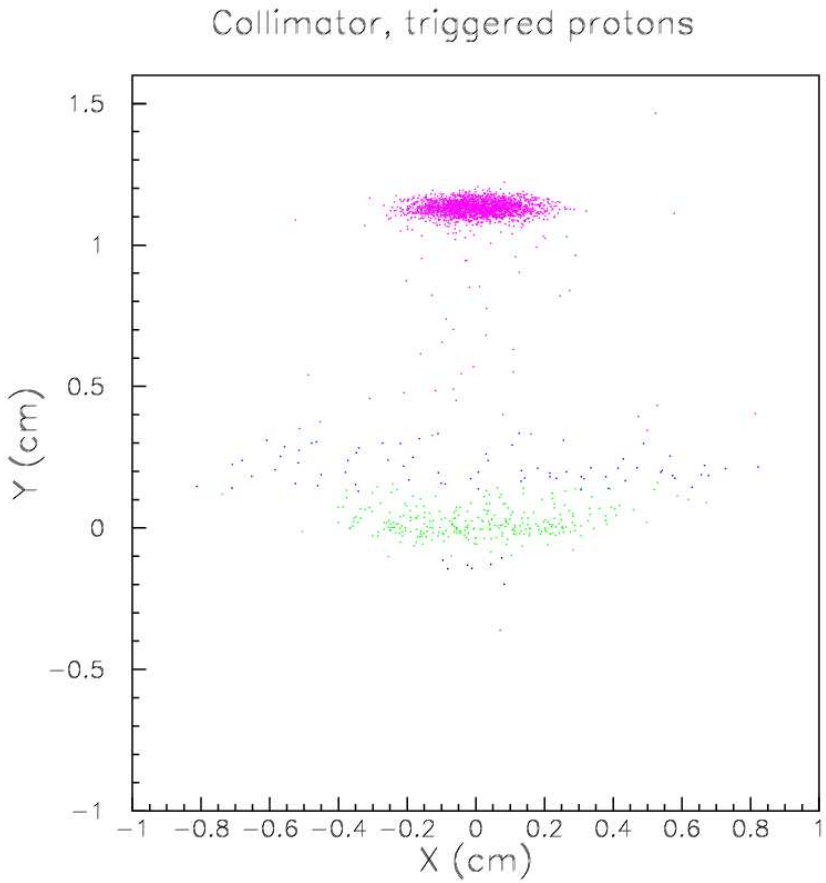


New

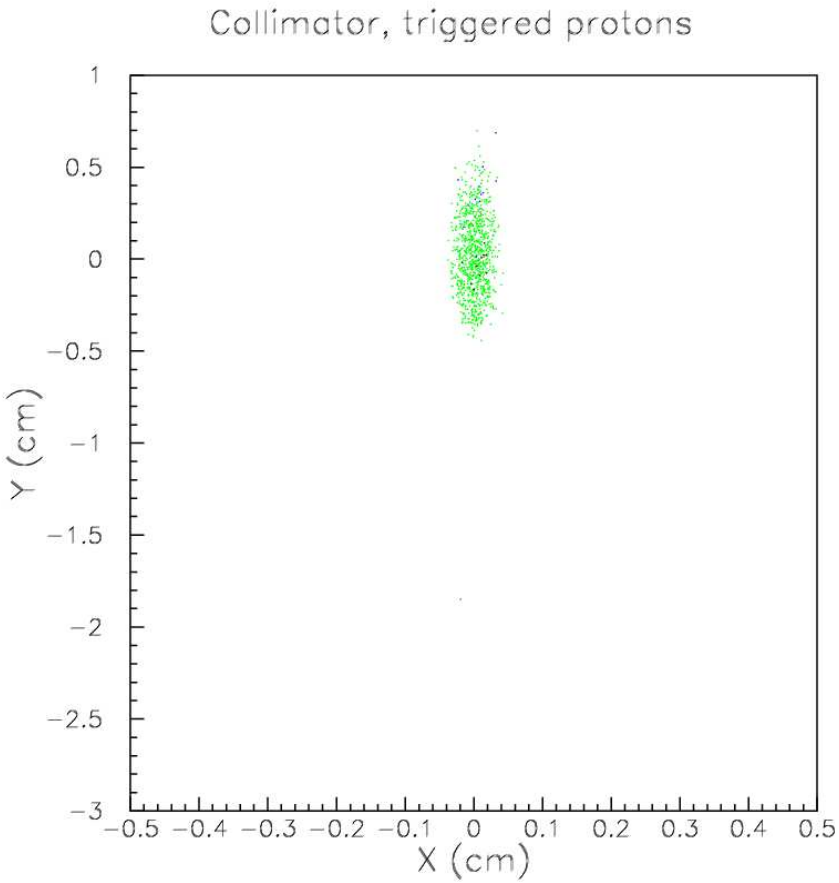


Beam profiles at collimator for triggered protons

Old

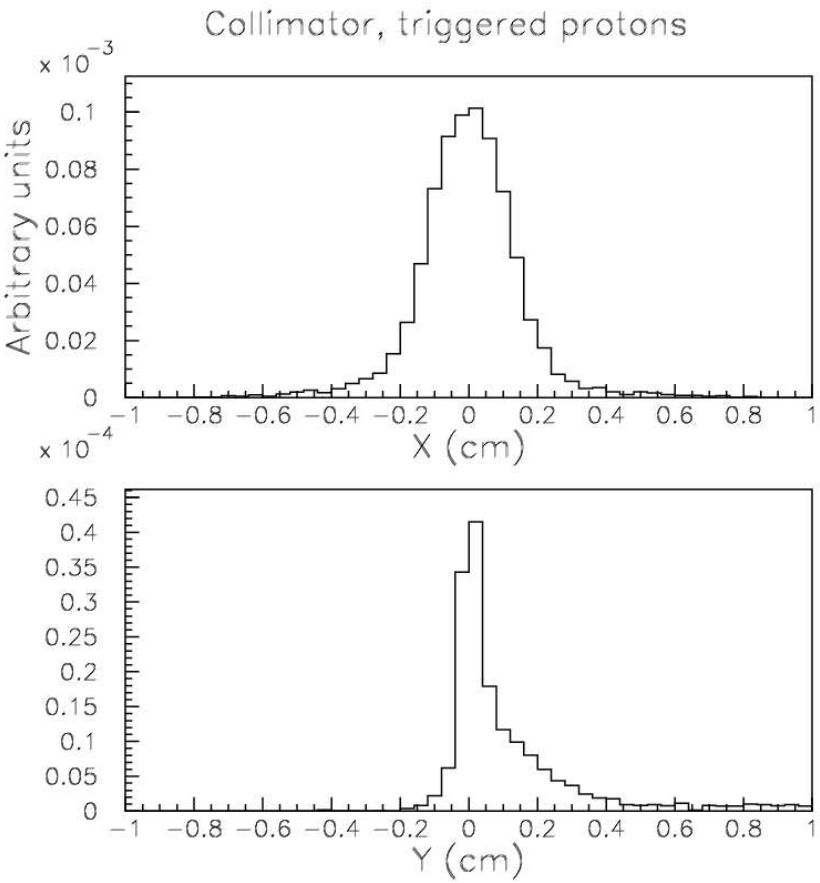


New

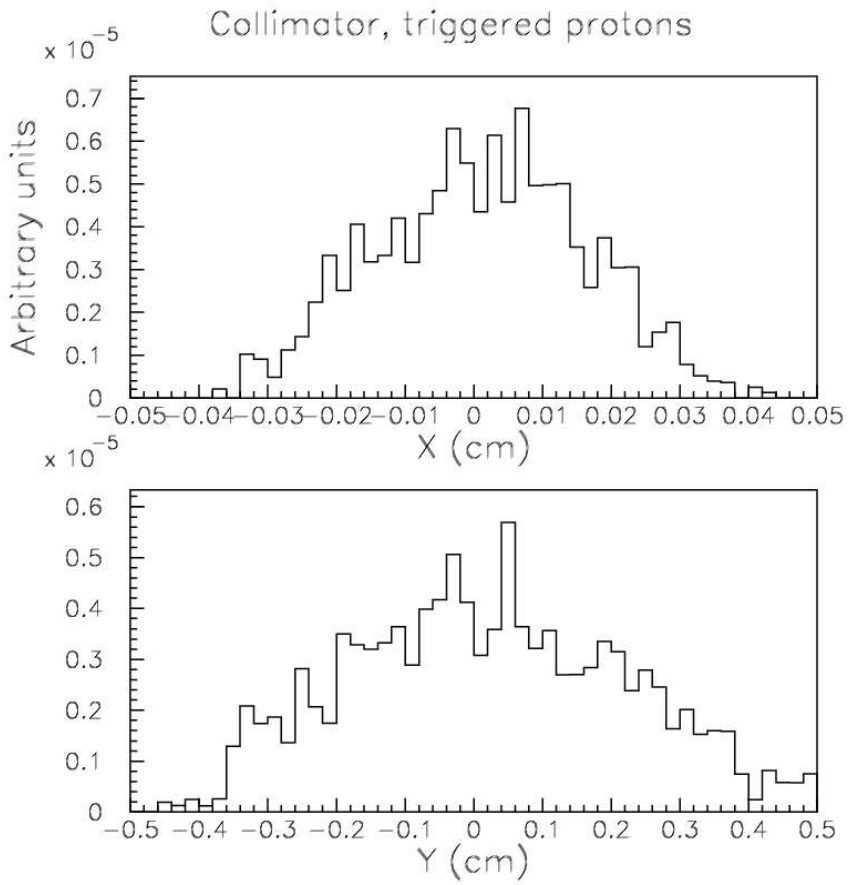


Triggered protons, X and Y projections

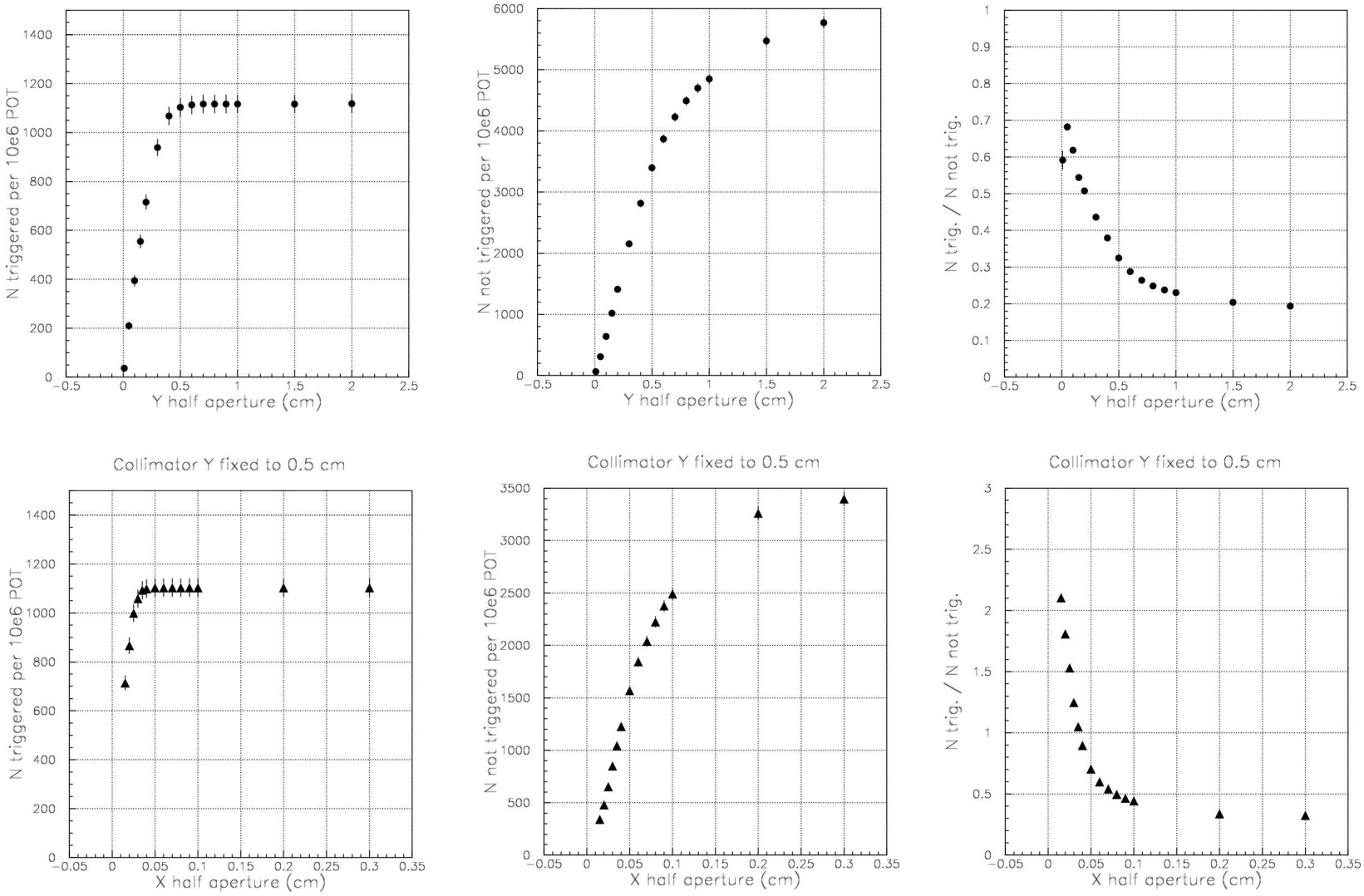
Old



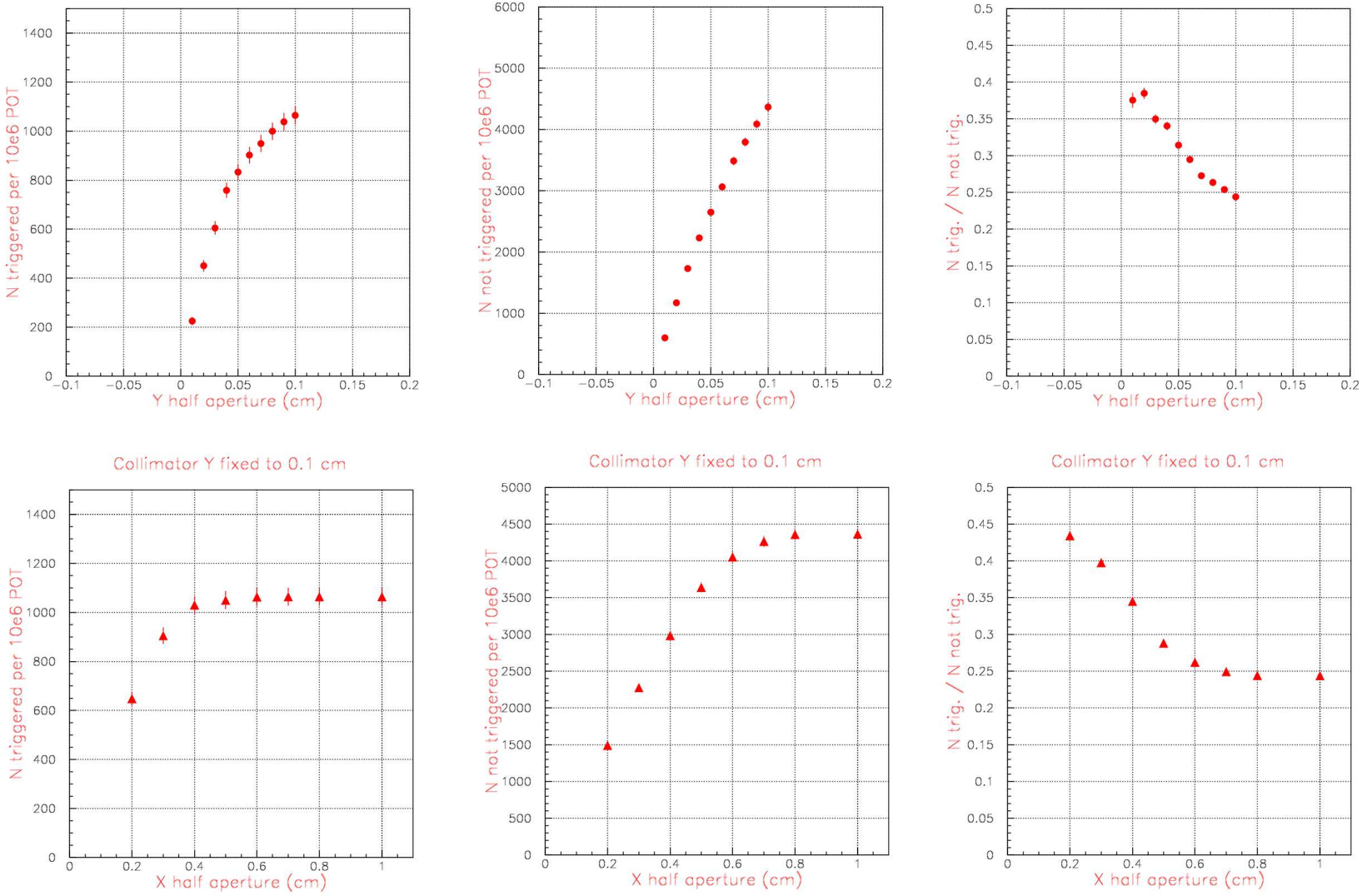
New



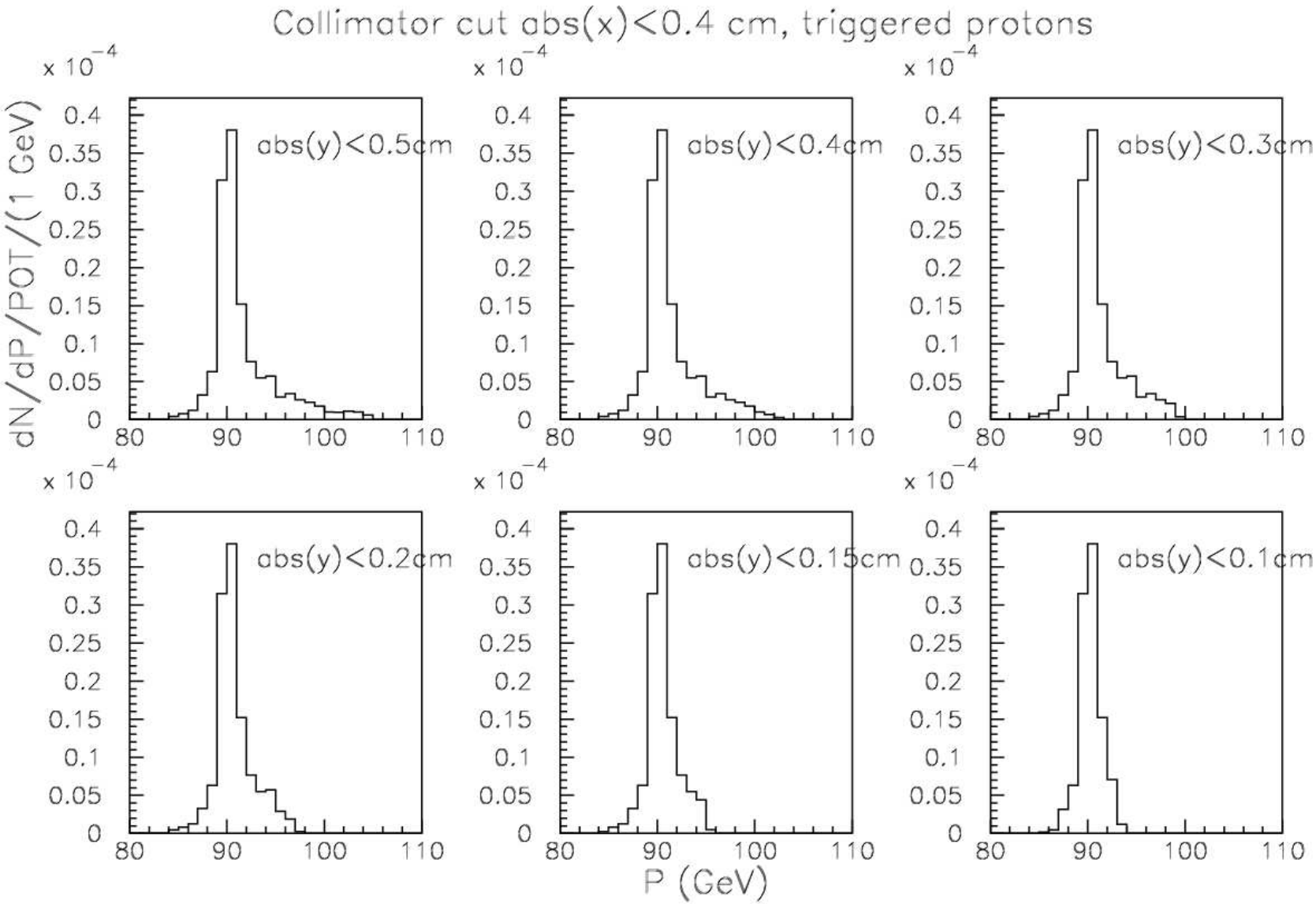
Signal/background variation, new design



Signal/background variation, old design

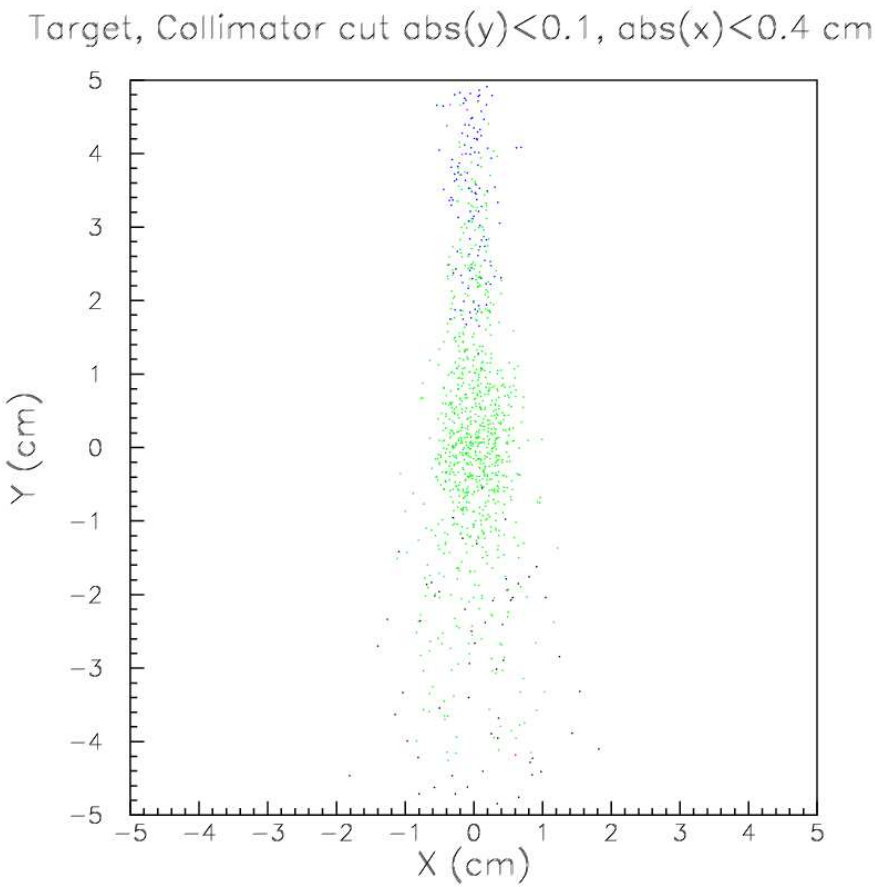


Triggered proton spectra for various collimator apertures, old design

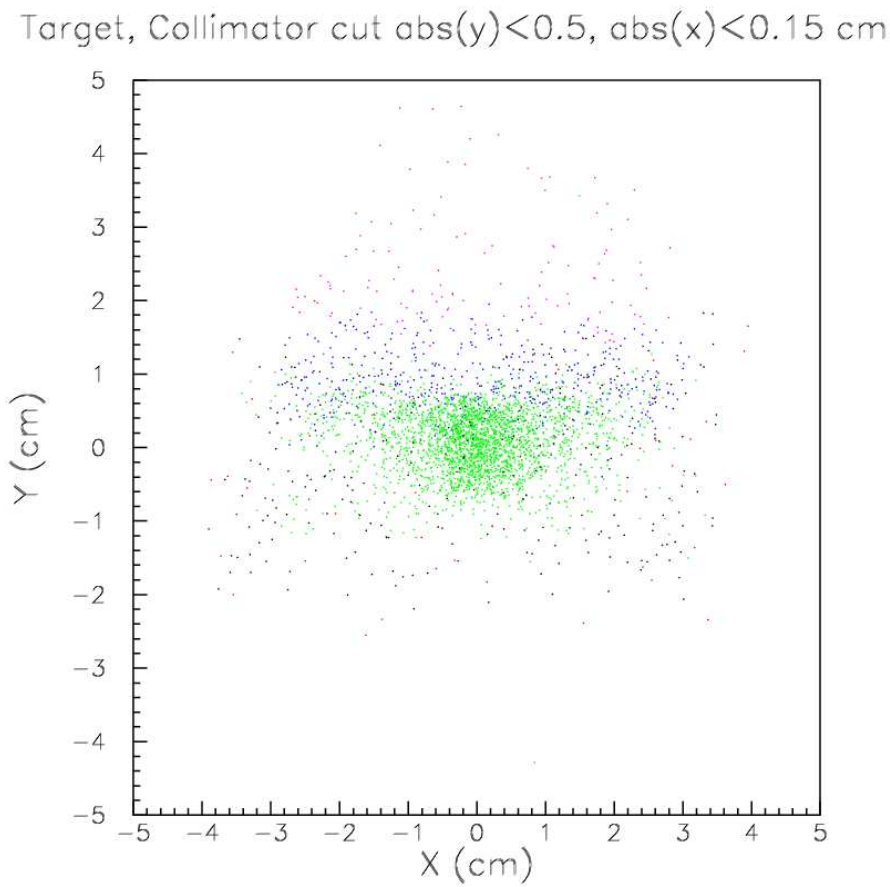


Beam profiles at MIPP target after collimator cuts

Old

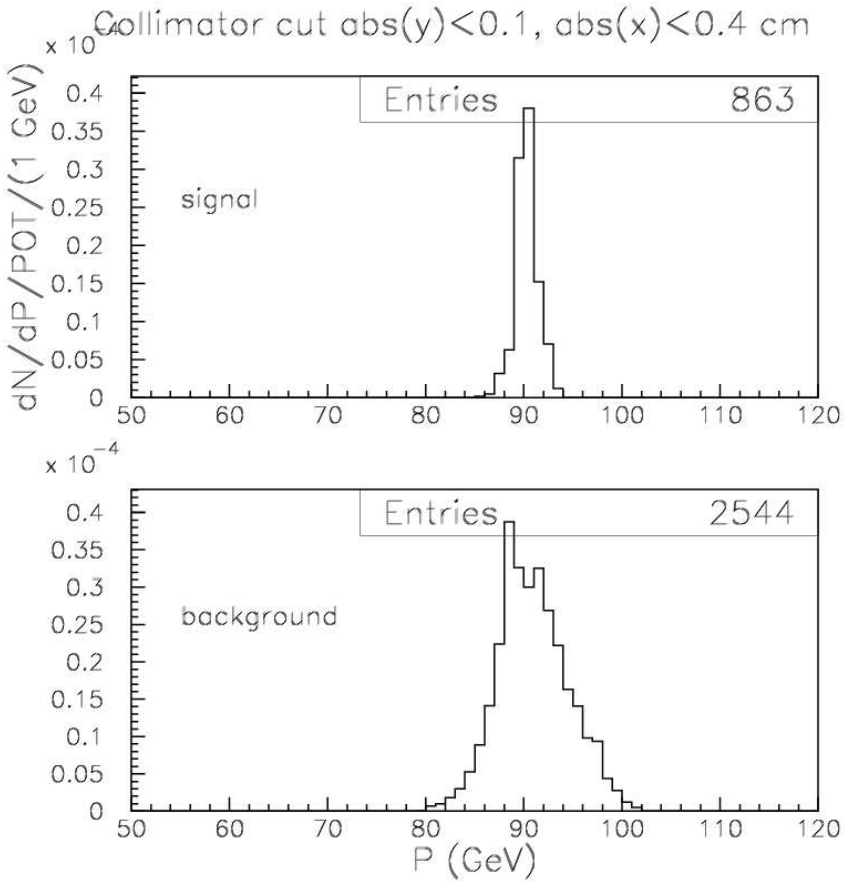


New

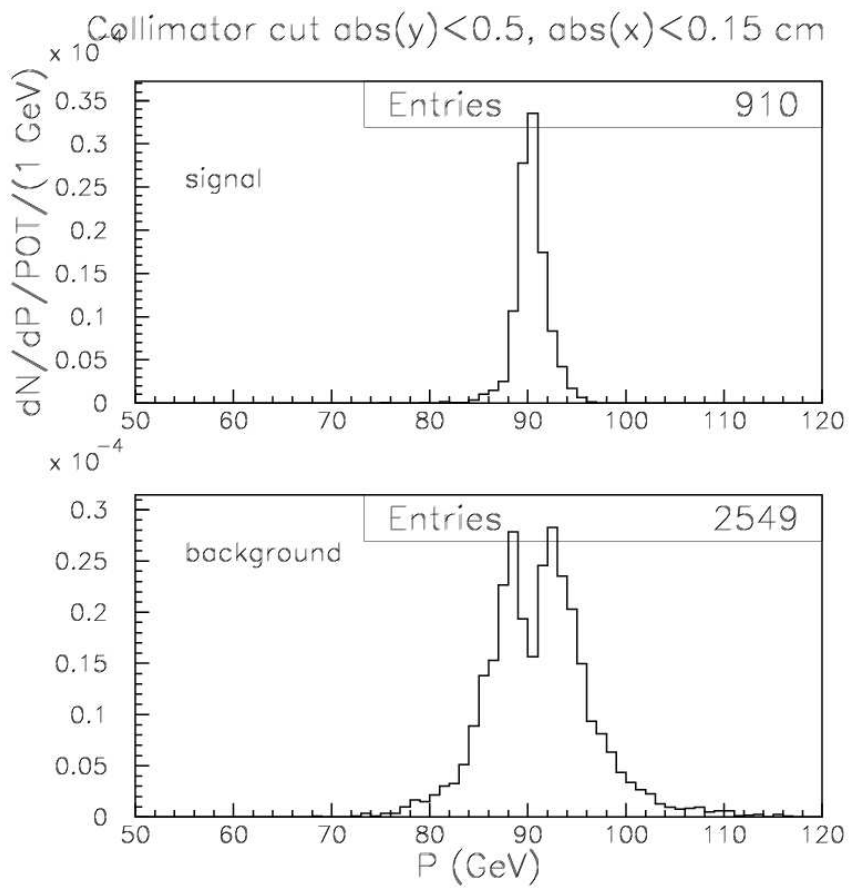


Signal/background after collimator cuts

Old



New



Need 1.0e8 protons on primary target to get 1.0e5 triggered

Other effects:

−beam instability due to magnet current variation (0.5 −1% ?)

−collimator aperture increase to compensate for the beam instability

Conclusion:

New beam design is better (?)