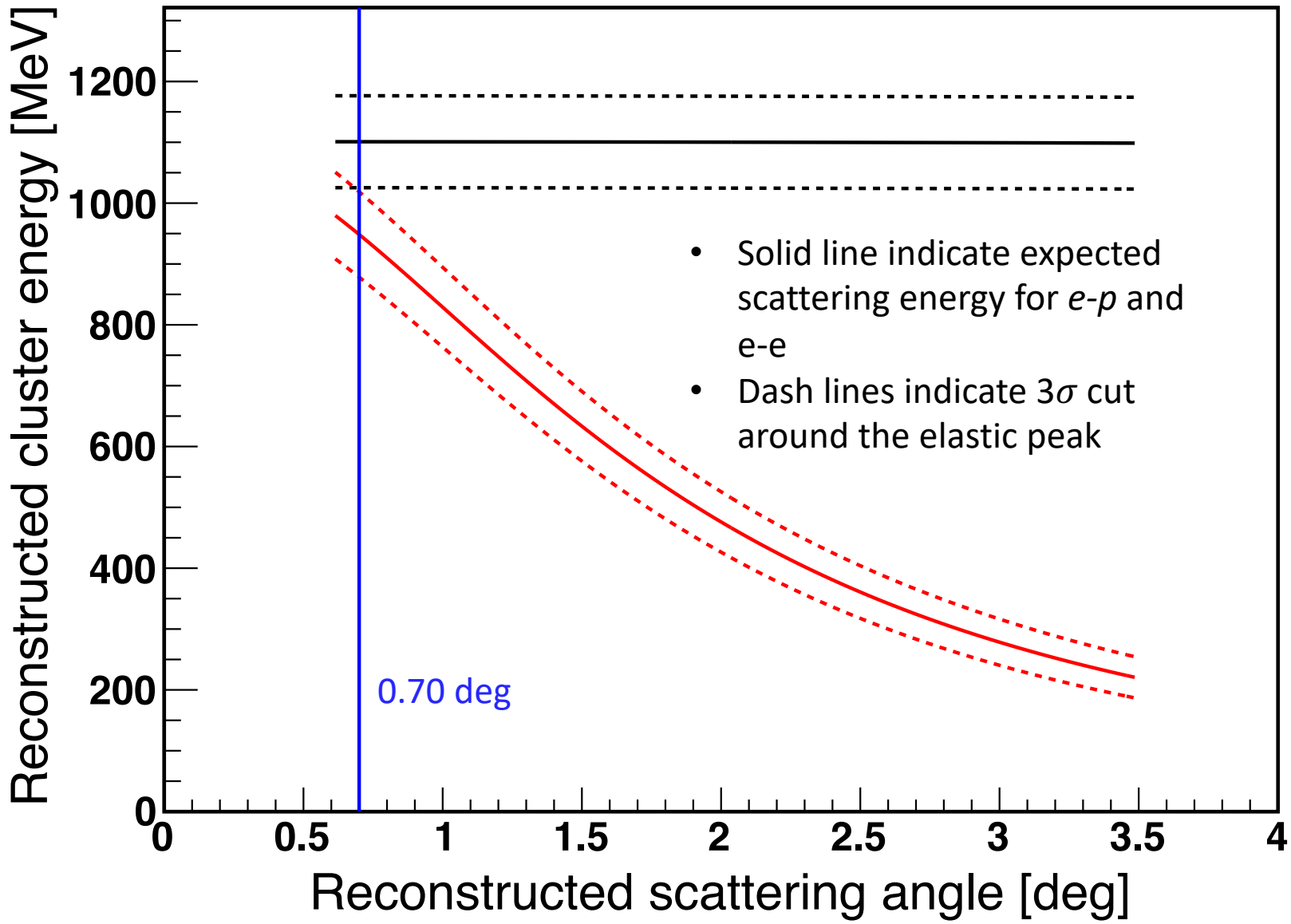
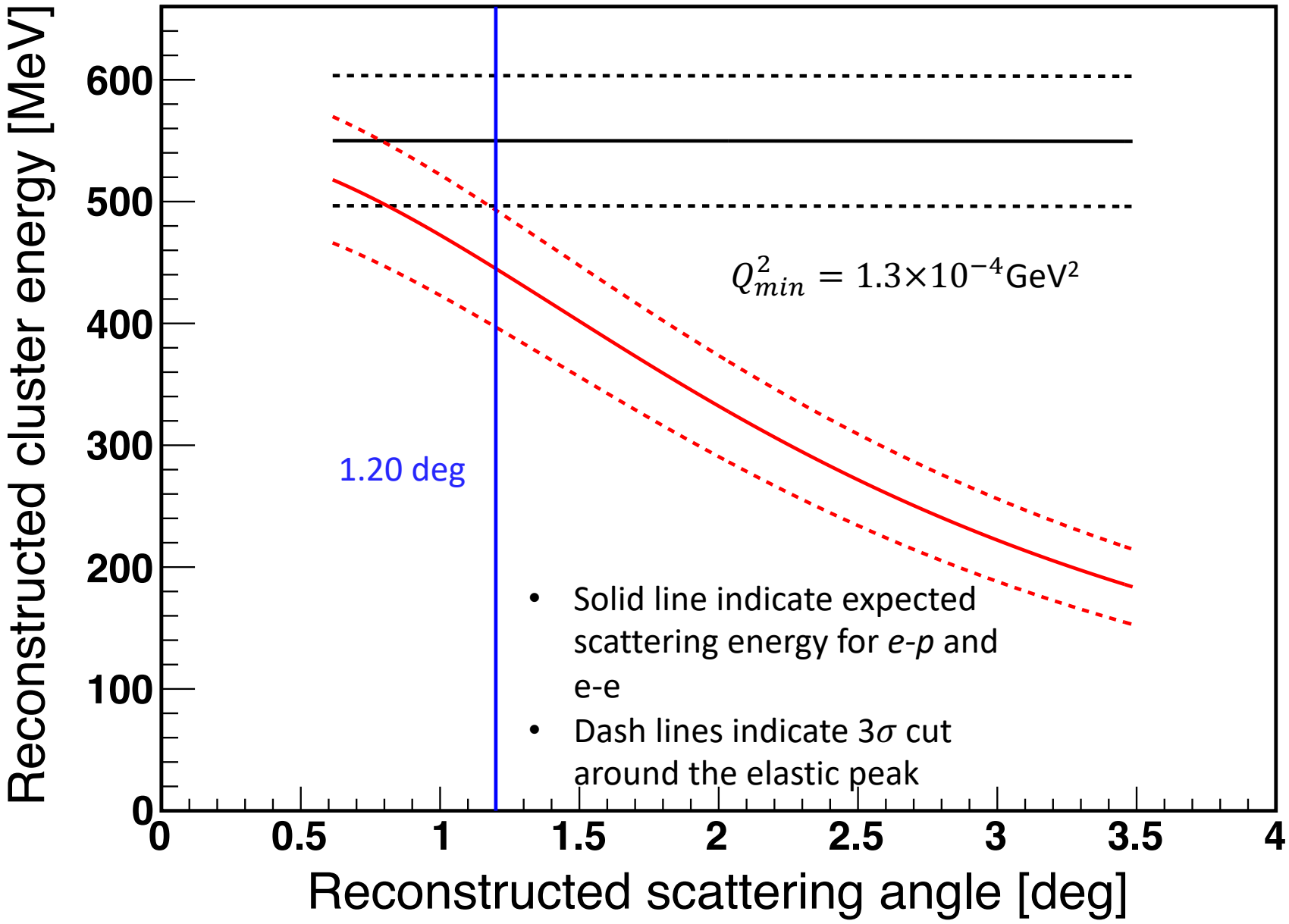
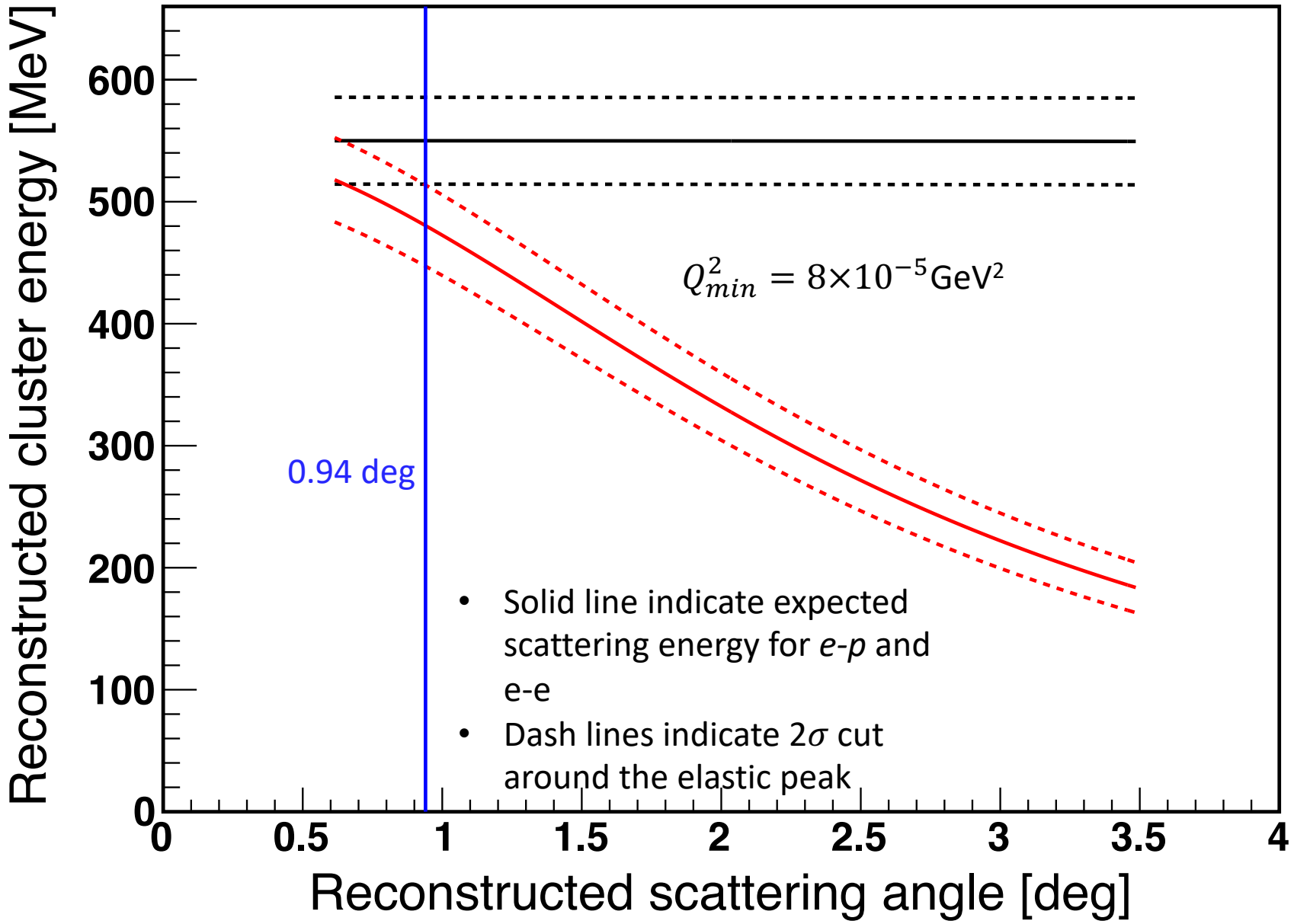
Event separation with Ebeam = 1101MeV



Event separation with Ebeam = 550MeV



Event separation with Ebeam = 550MeV

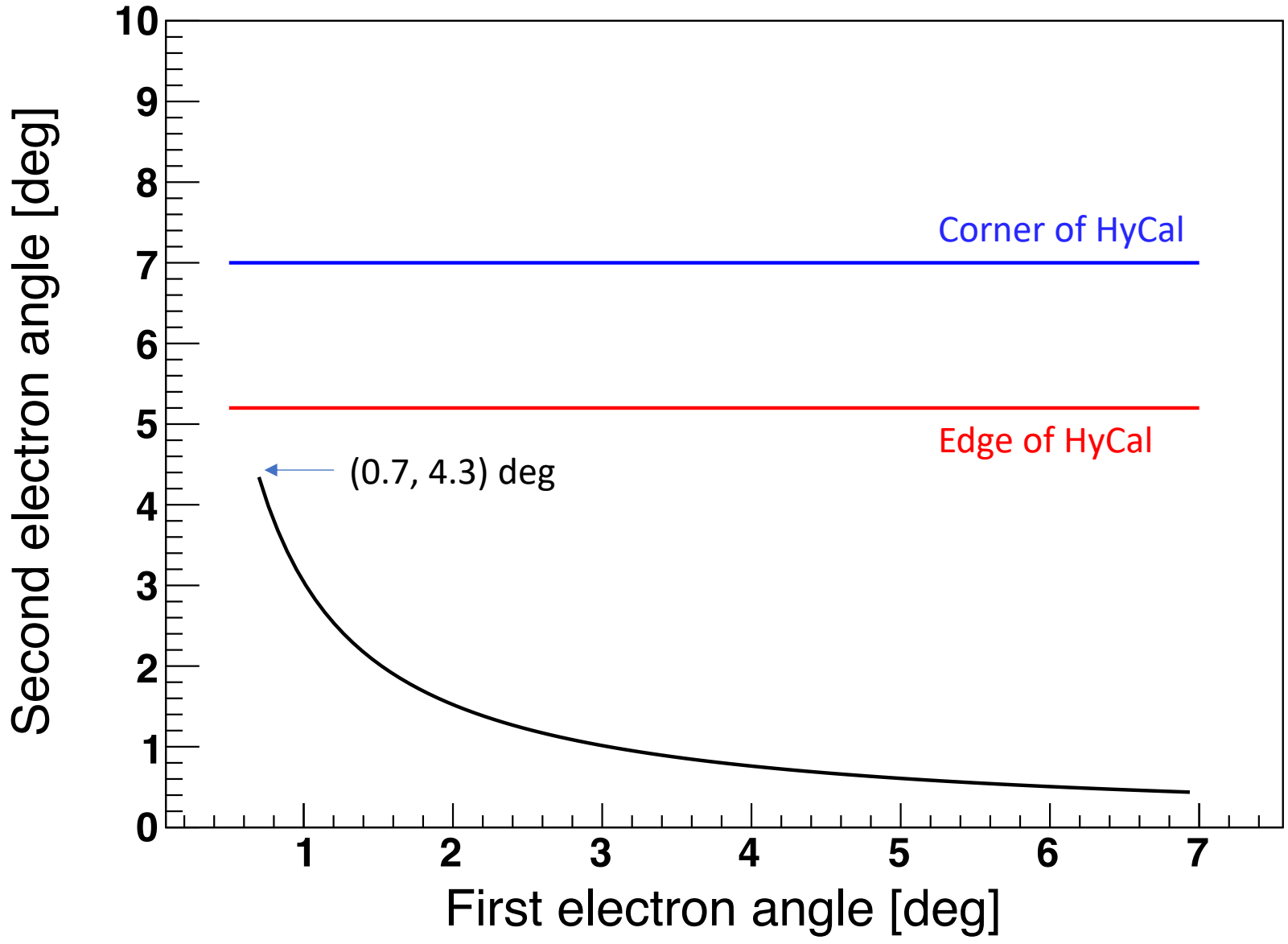


Event separation with Ebeam = 550MeV

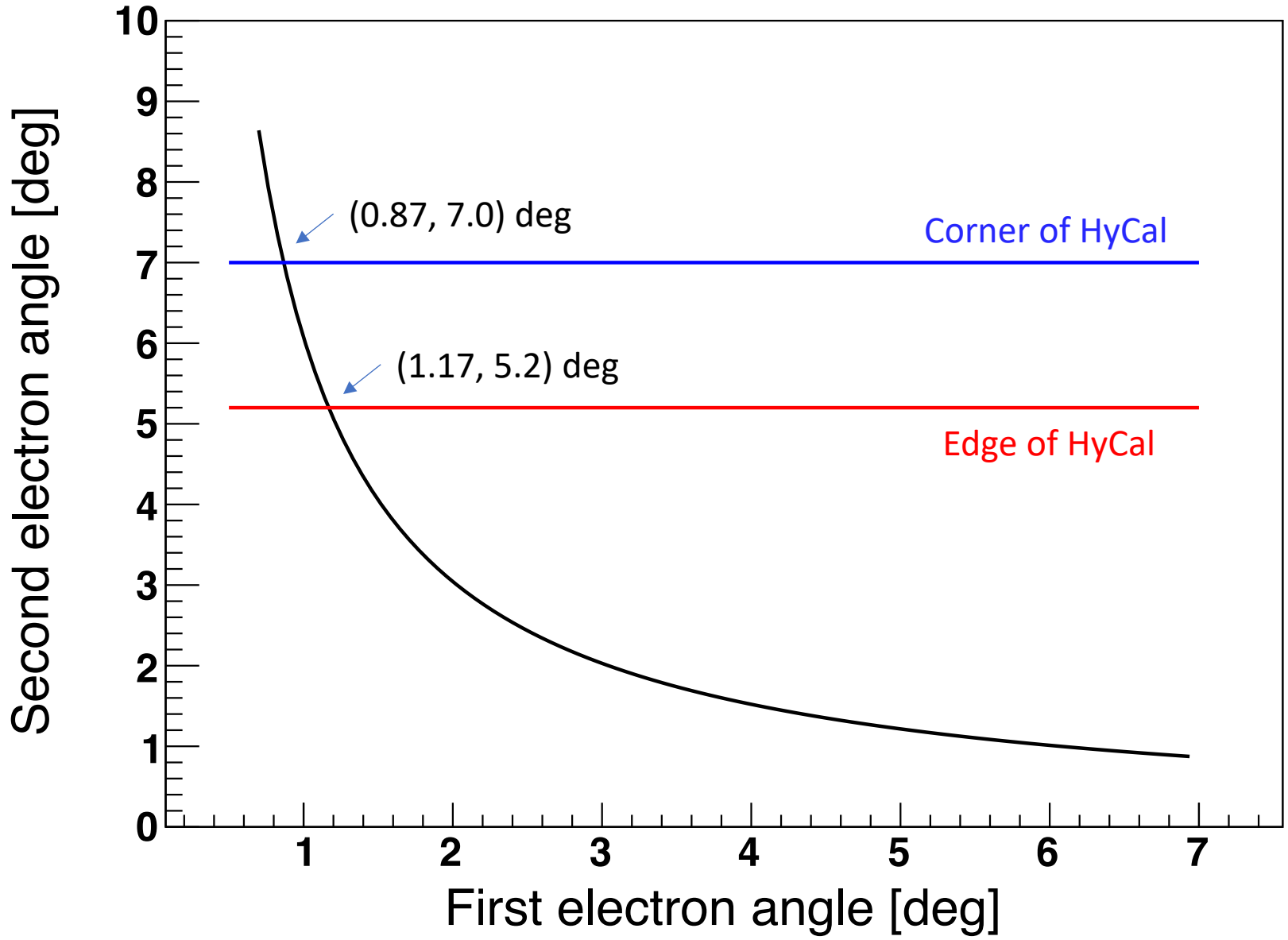
- So to go below 1e-4 GeV^2 for minimum Q^2 with beam energy 550MeV, we need to go down to at least 1deg for the scattering angle

- Possible solution:
  1. Use tighter event selection cut (2 sigma)
  2. Detect double arm Moller to veto the Moller in smaller angle region when selecting e-p
  3. Use recoil detector to detect the recoiled proton

Double arm Moller acceptance with Ebeam = 1101MeV



Double arm Moller acceptance with Ebeam = 550MeV



Summary for Ebeam = 550MeV

- Solution 1 (using tighter kinematic cuts):
  1. With 3sigma cut, we can go down to theta = 1.20 deg, or $Q^2_{min} = 1.3\times10^{-4}$GeV^2
  2. With 2sigma cut, we can go down to theta = 0.94 deg, or $Q^2_{min} = 8\times10^{-5}$GeV^2

- Solution 2 (using double arm Moller to veto Moller):
  1. If we want to have a full azimuthal angle acceptance for Moller, we can only go down to 1.17 deg, below this angle, some of the Moller will not hit HyCal, and we have only 1 hit. Basically this is not helping.
  2. If we do not require full azimuthal angle acceptance, this means that we can only do this veto for certain azimuthal angle, we can get down to 0.87 deg, or $Q^2_{min} = 7\times10^{-5}$GeV^2. But certainly will get larger systematic uncertainty.