Low Energy Elastic Scattering

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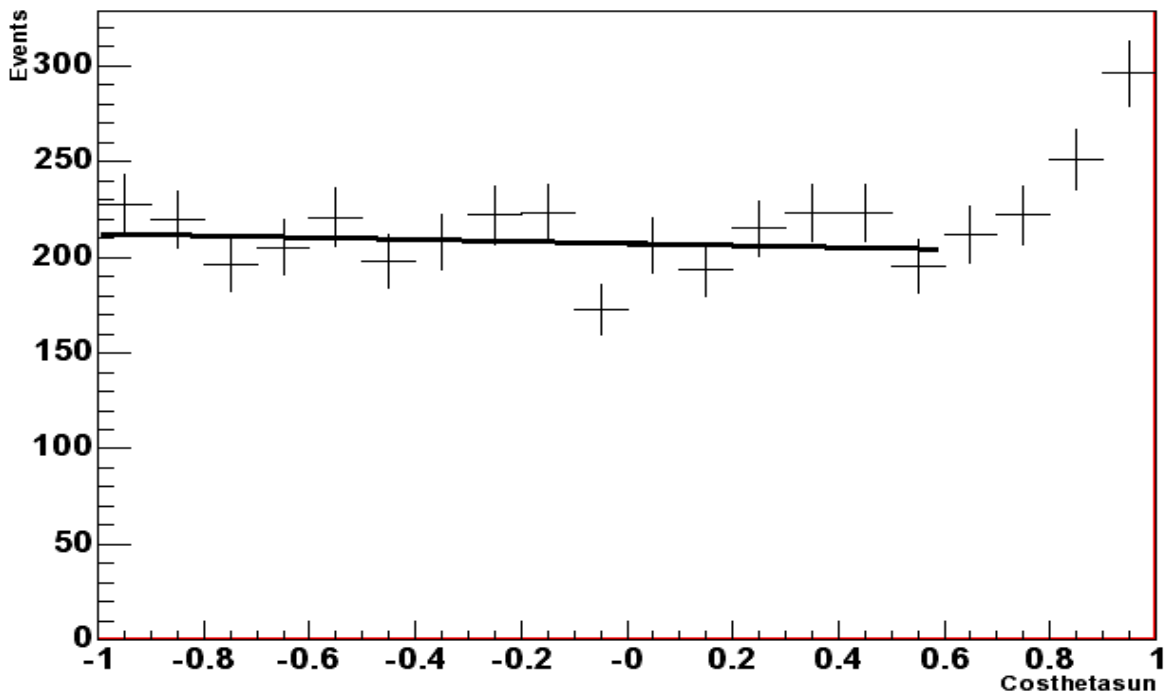
Undergraduate Thesis:

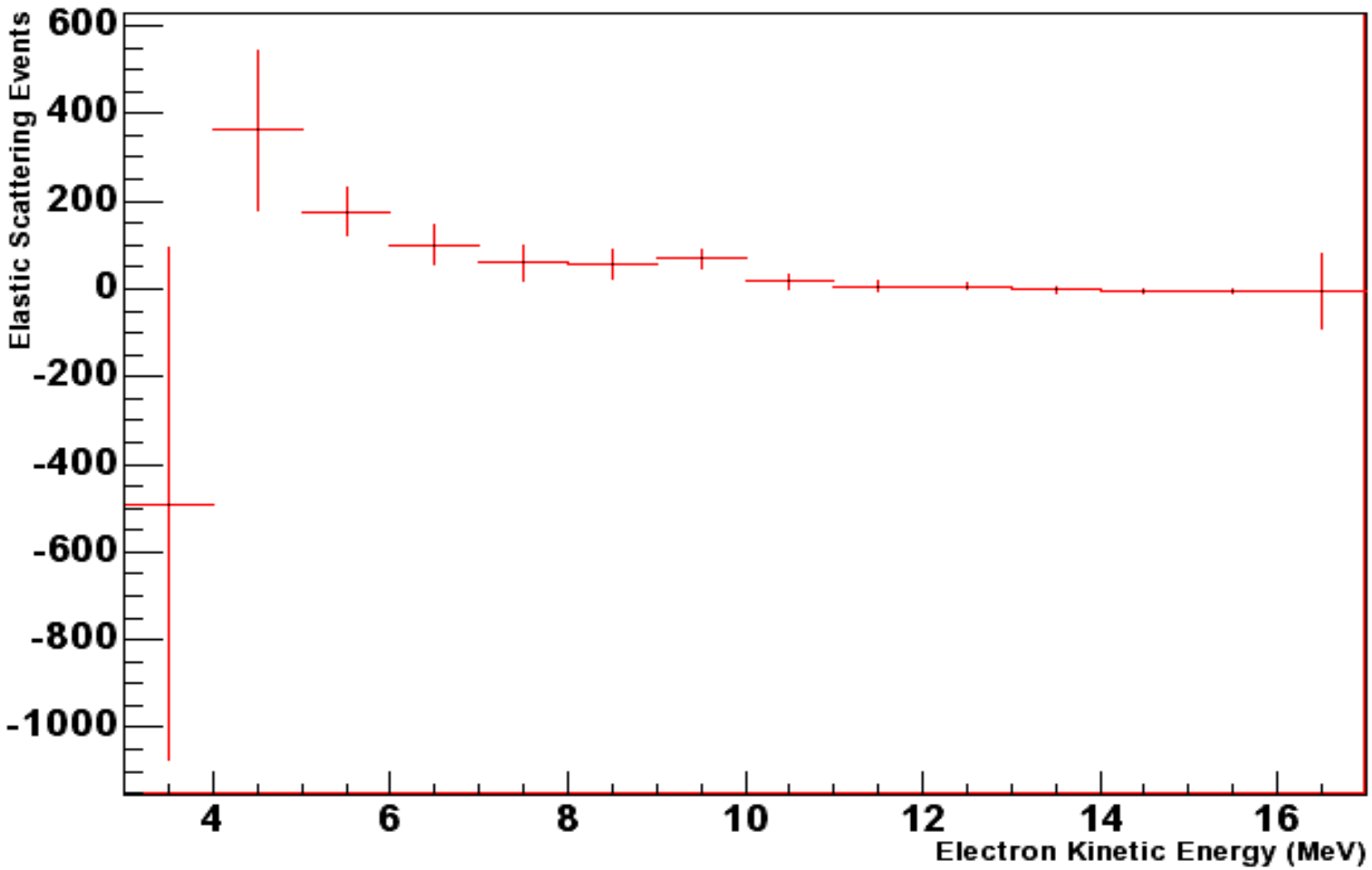
Signal Extraction By Bin Counting

- ES signal has limited range in Costhetasun (due to kinematics)
- Assume linear background
- Fit background in ES free region
- Count events above background in signal region

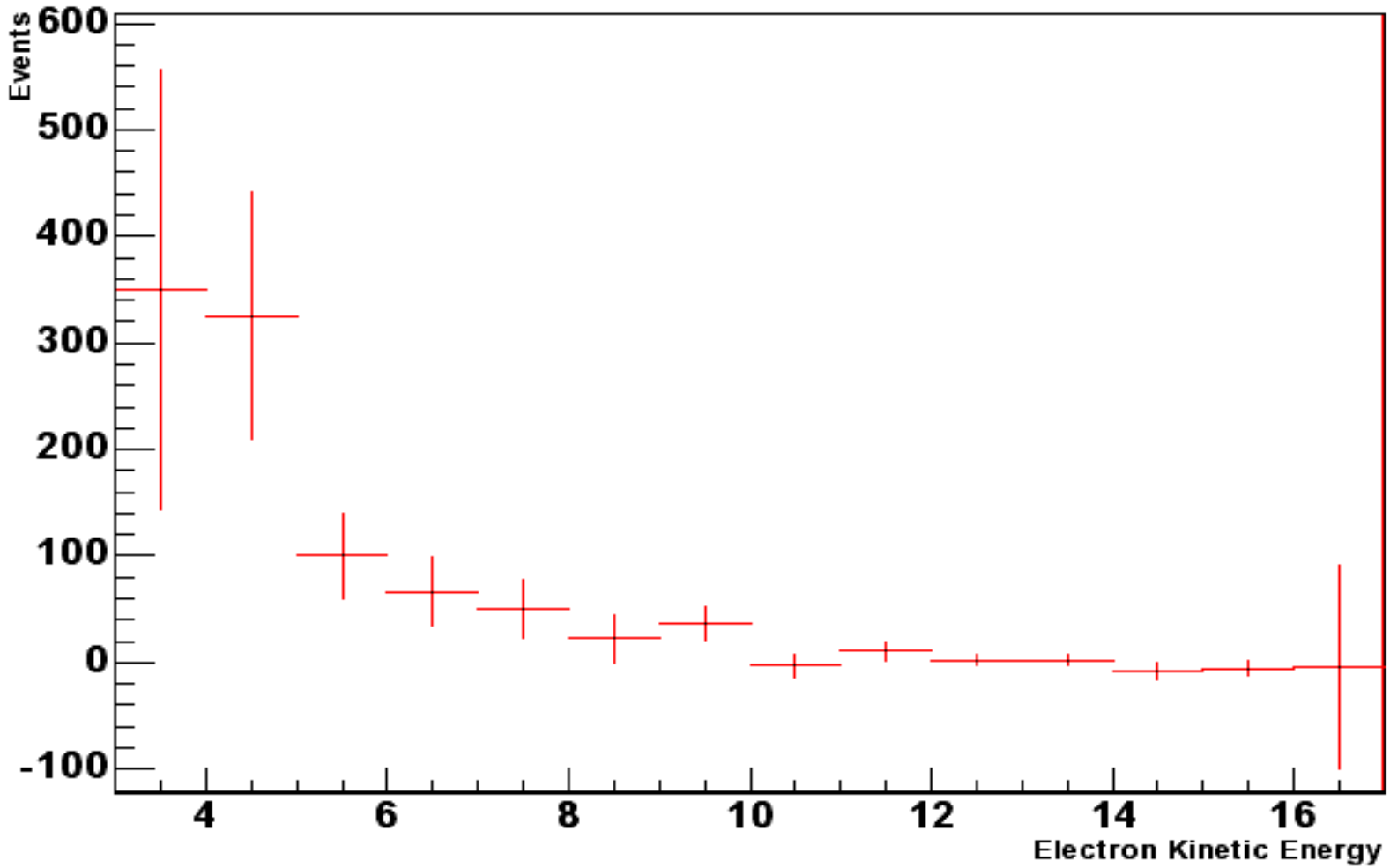


Spectrum Extracted by Bin Counting

Standard Analysis Cuts



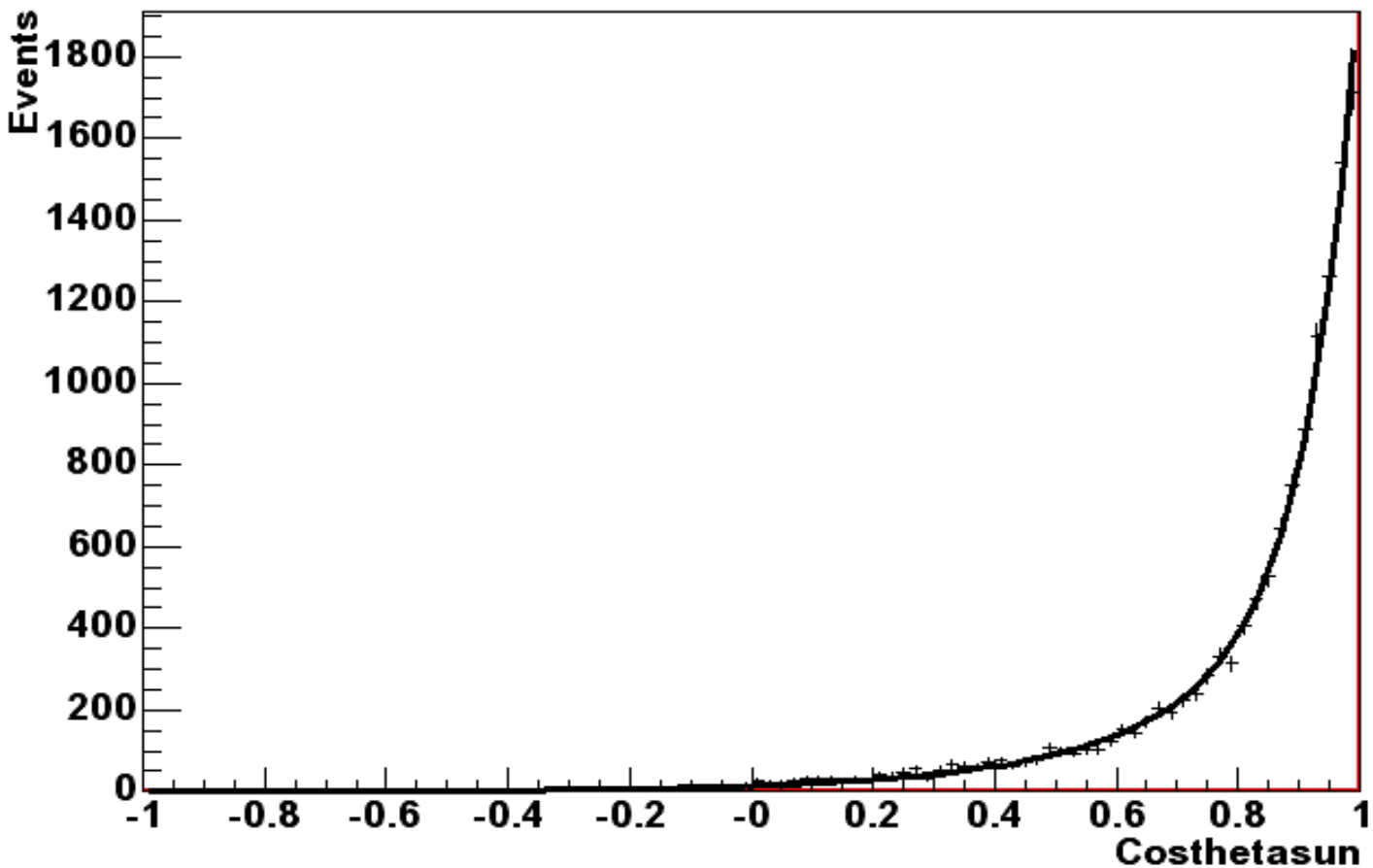
Modified Background Cuts



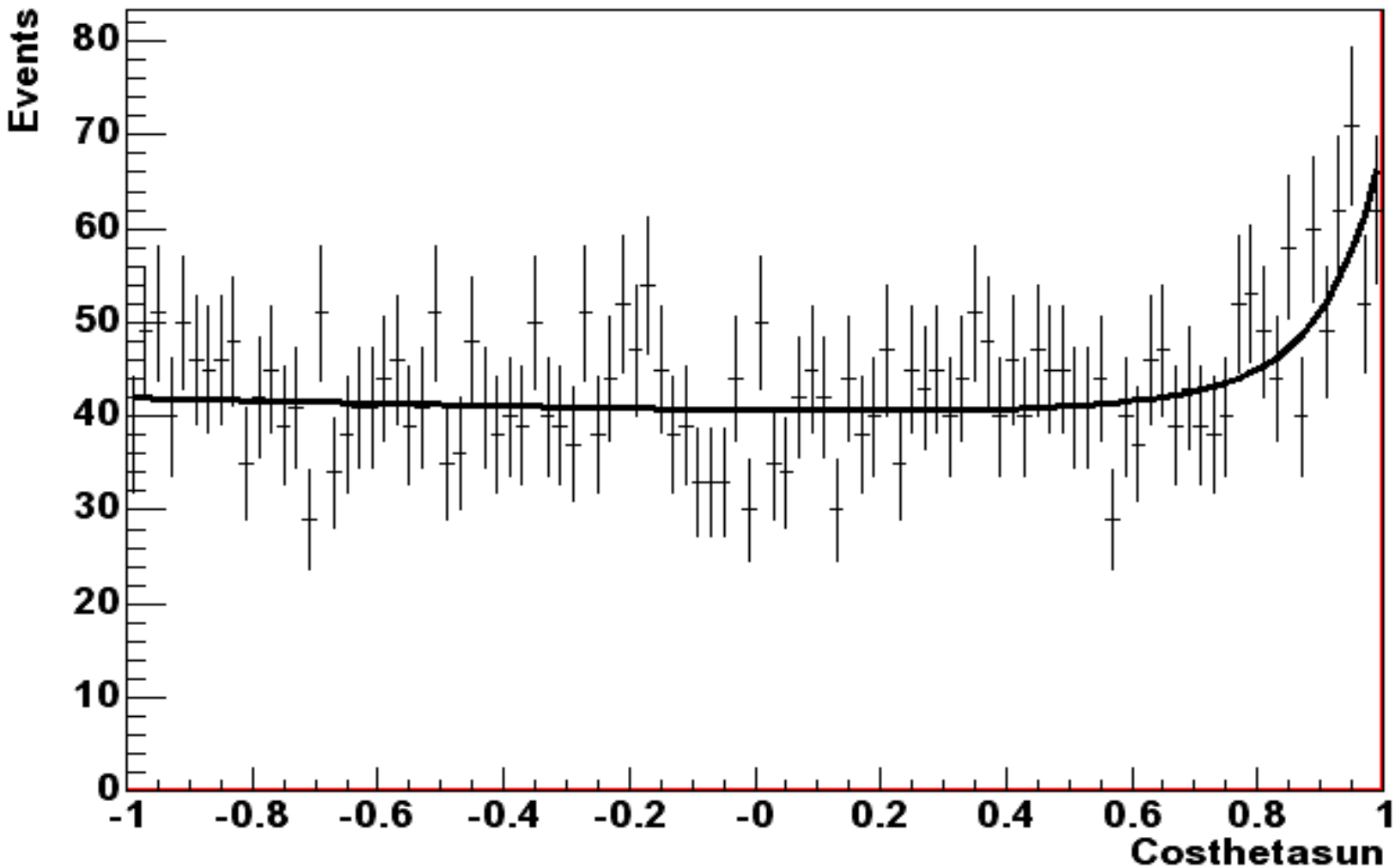
A 2-sigma extraction at 3-4 MeV appears to be possible.

Signal Extraction Using MC Shape

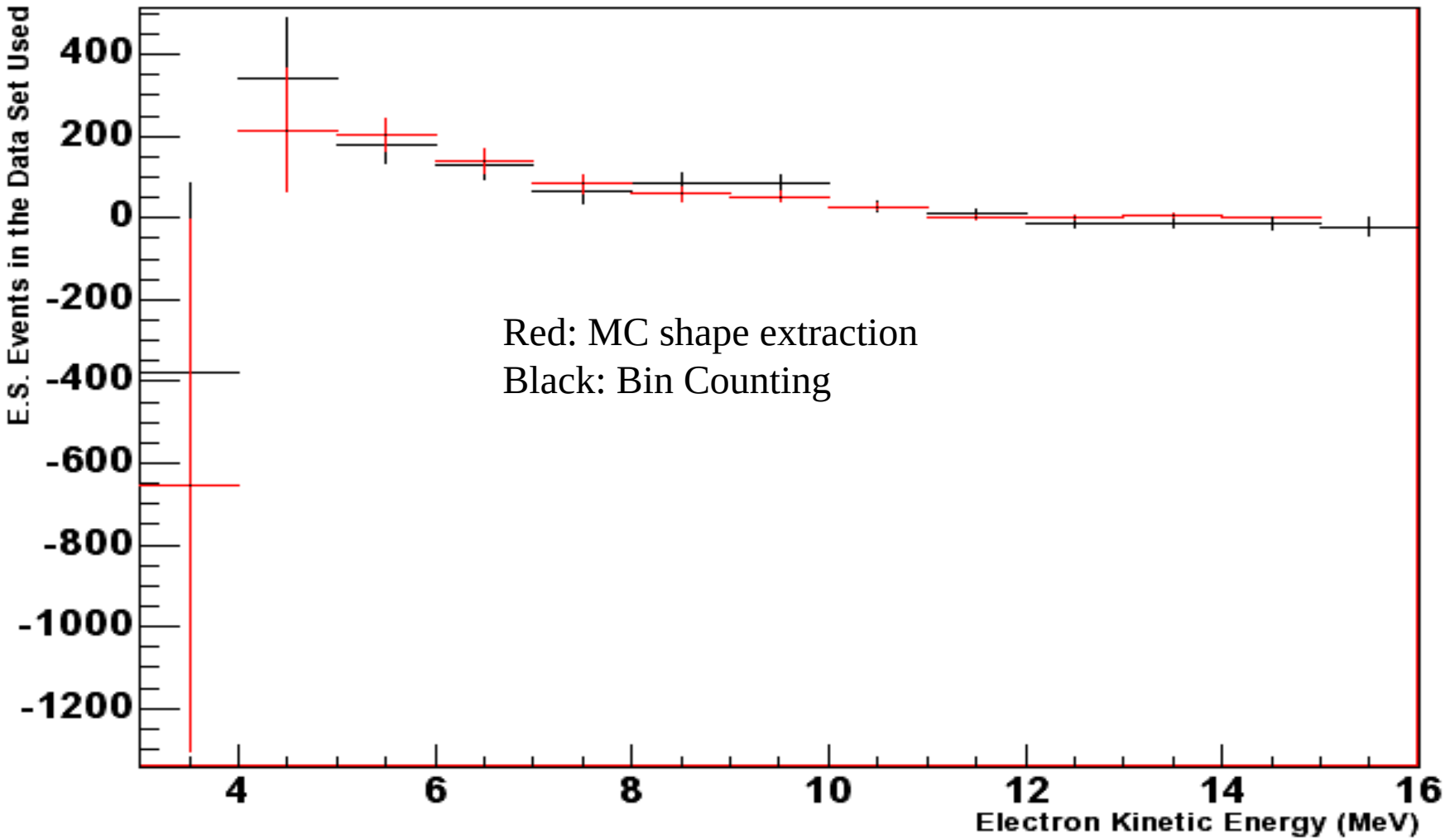
- Large elastic scattering monte carlo
- Determine the ES costhetasun distribution in each energy bin using the MC



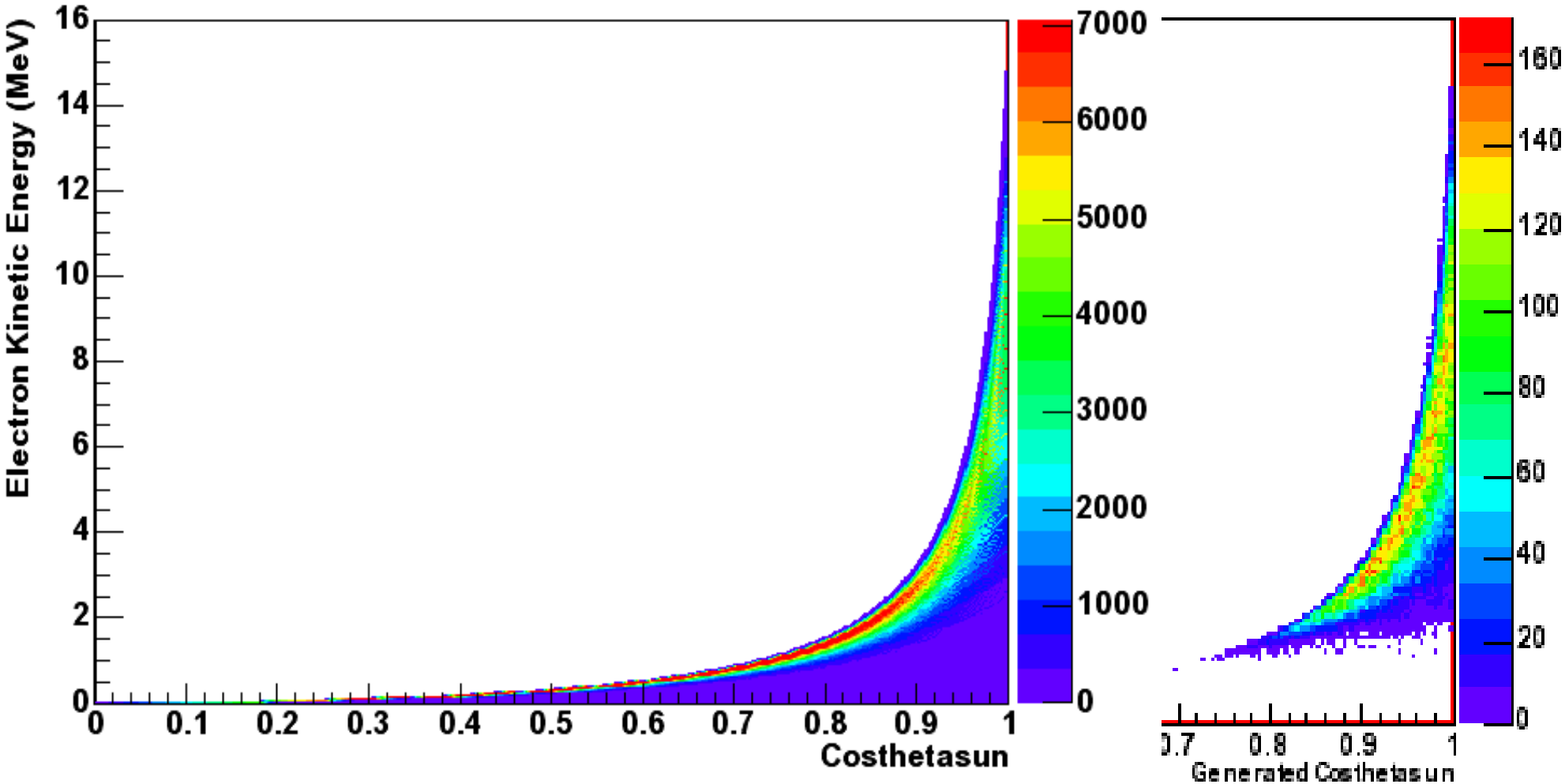
- Fit this shape plus a linear background term to the data



The Elastic Scattering Spectrum

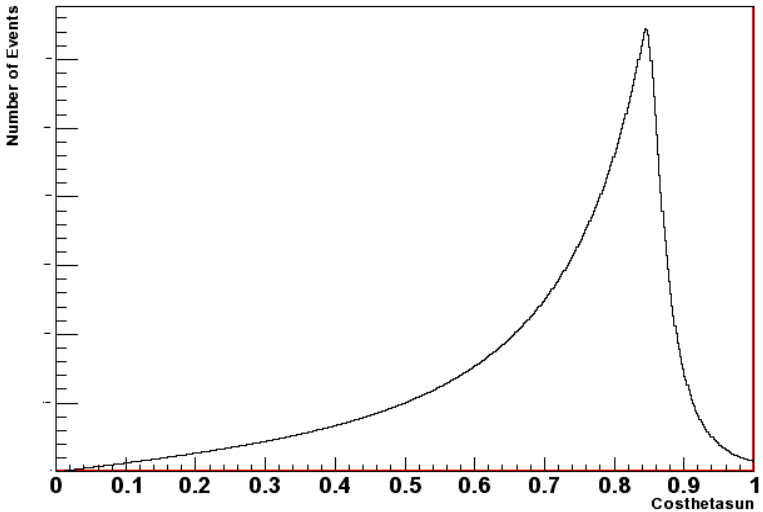


Interesting Feature of the Elastic Scattering Costhetasun Distribution

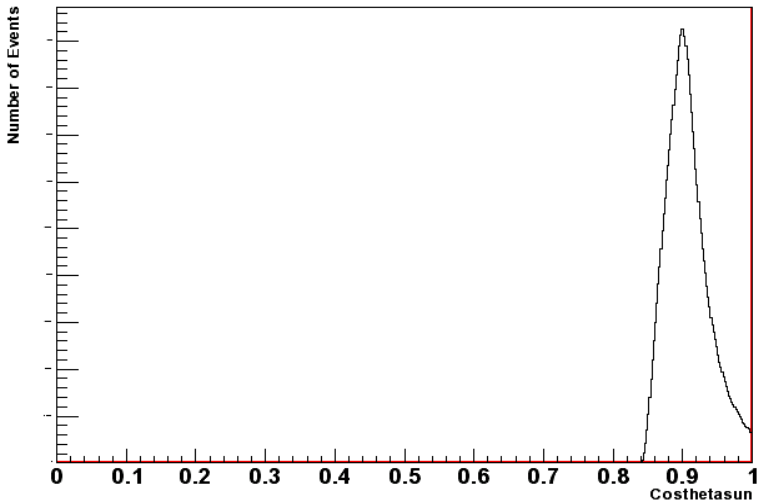


When binned in energy, the ES distribution is not necessarily forward-peaked in costhetasun.

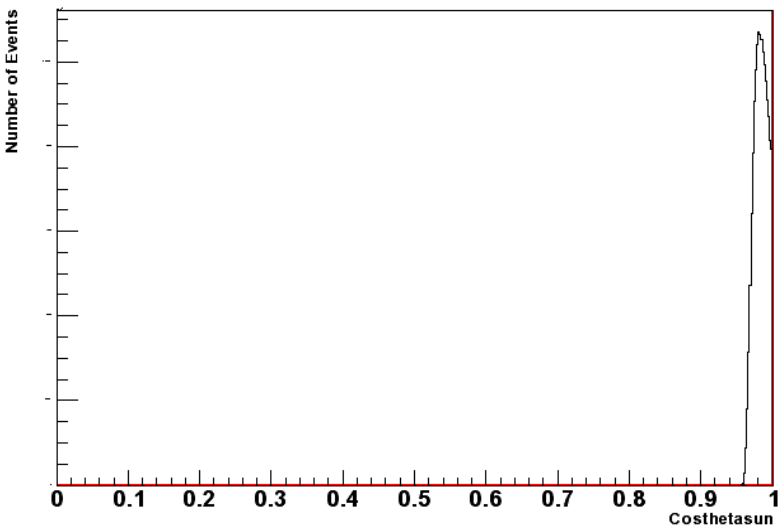
Below 2 MeV



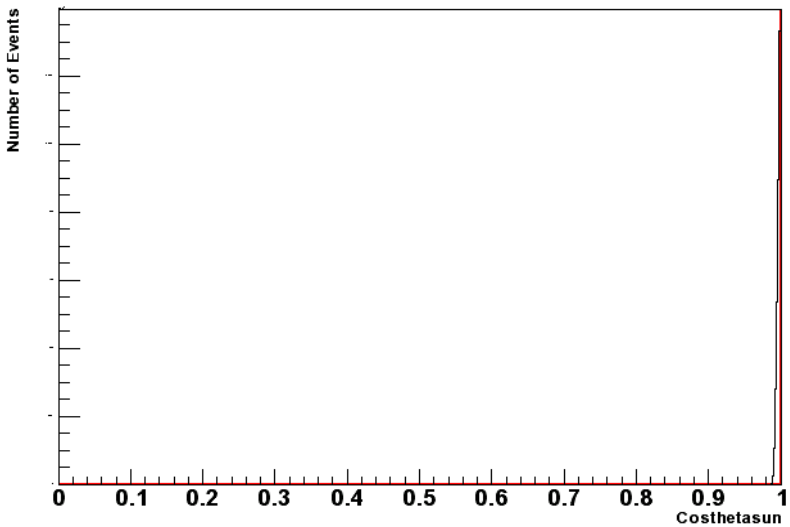
2 - 3 MeV



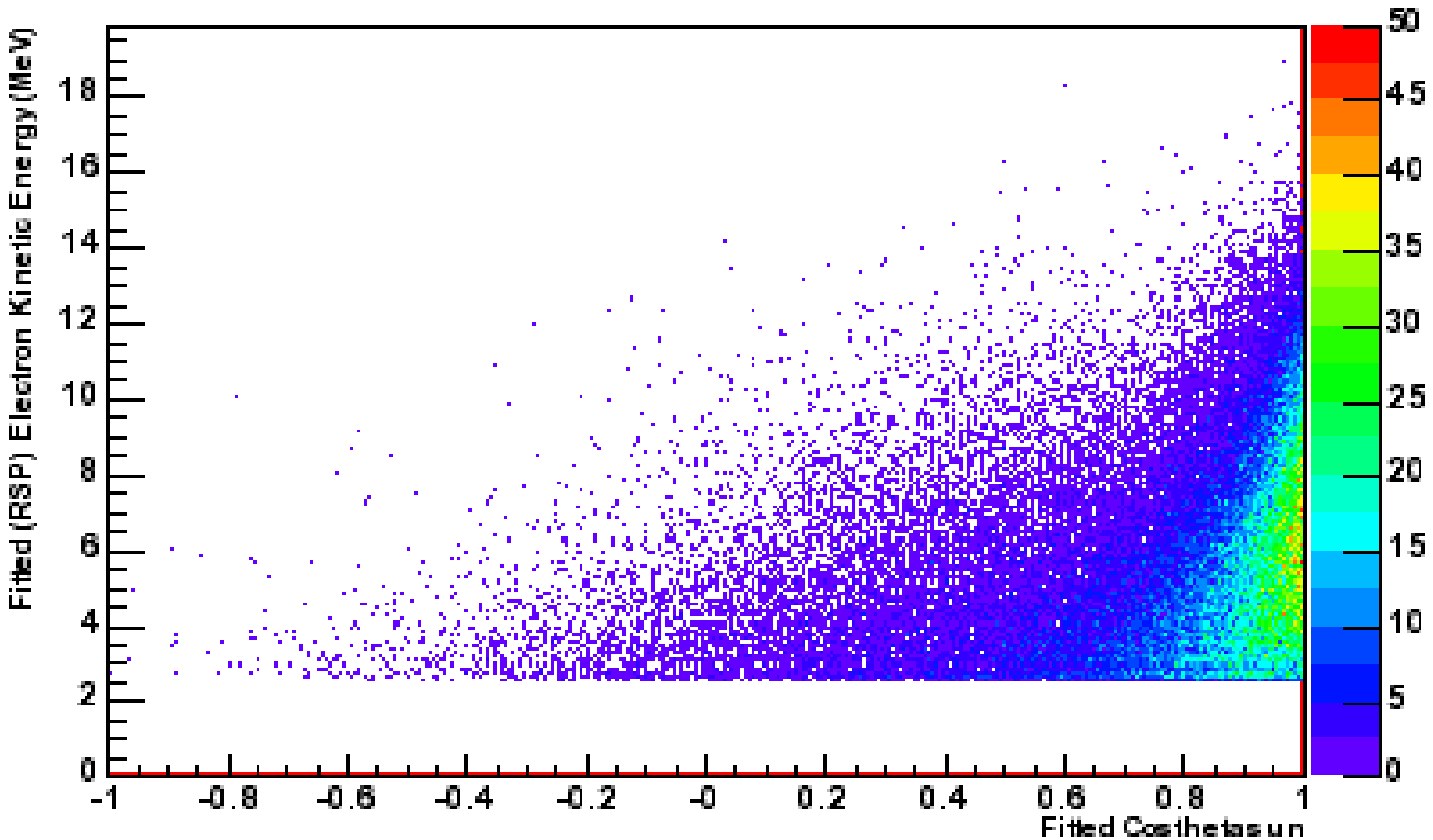
6 – 7 MeV



Above 10 MeV

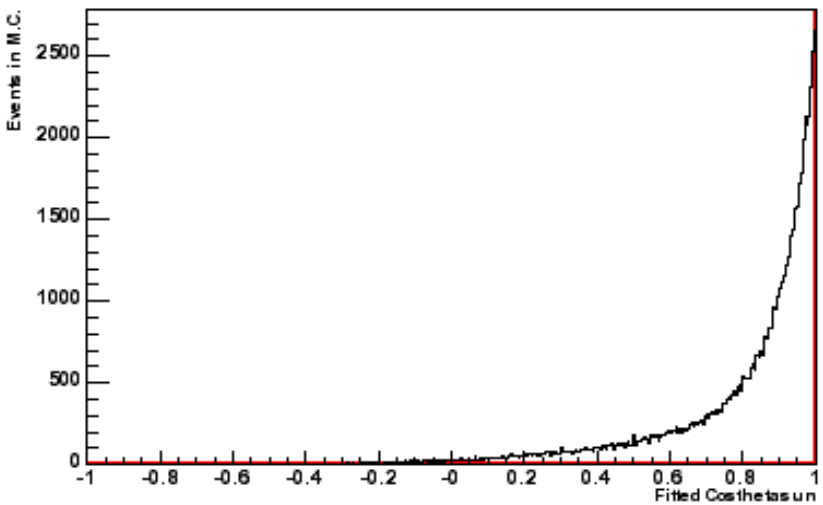


Detector angular response “smears” the costhetasun distribution

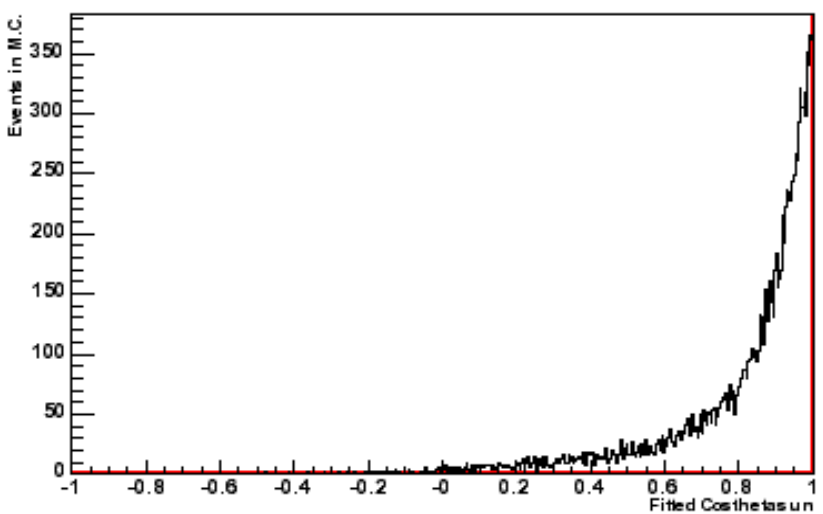


The smearing restores the forward-peaked costhetasun distribution.

3 – 4 MeV



5 – 6 MeV



9 – 10 MeV