BCAL Segmentation

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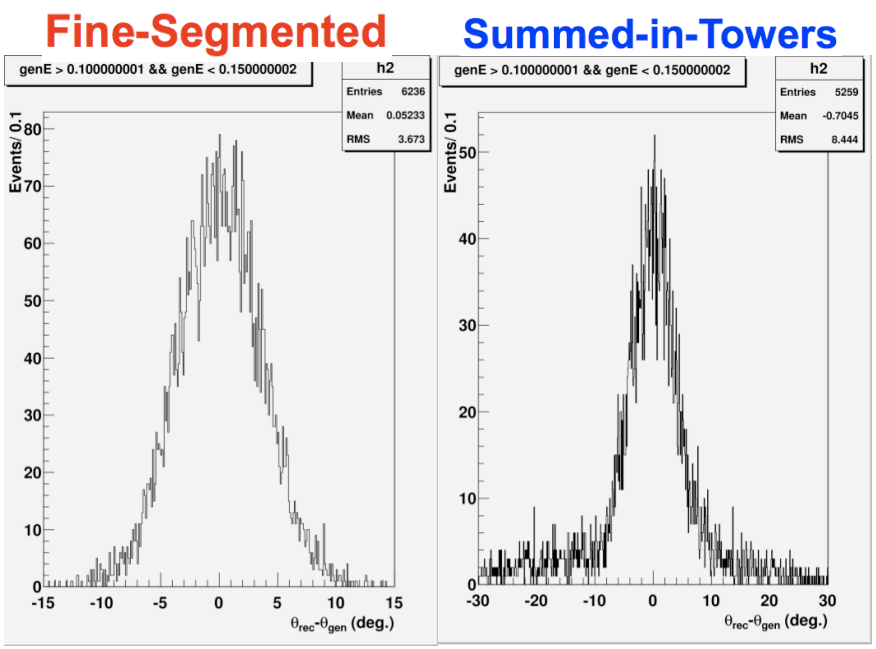
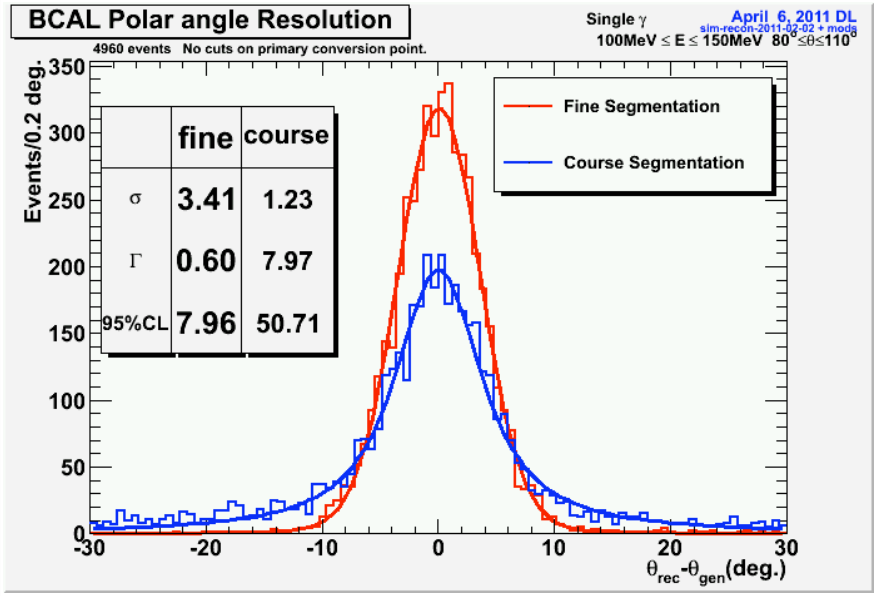
θ resolution at 90° for low energy photons

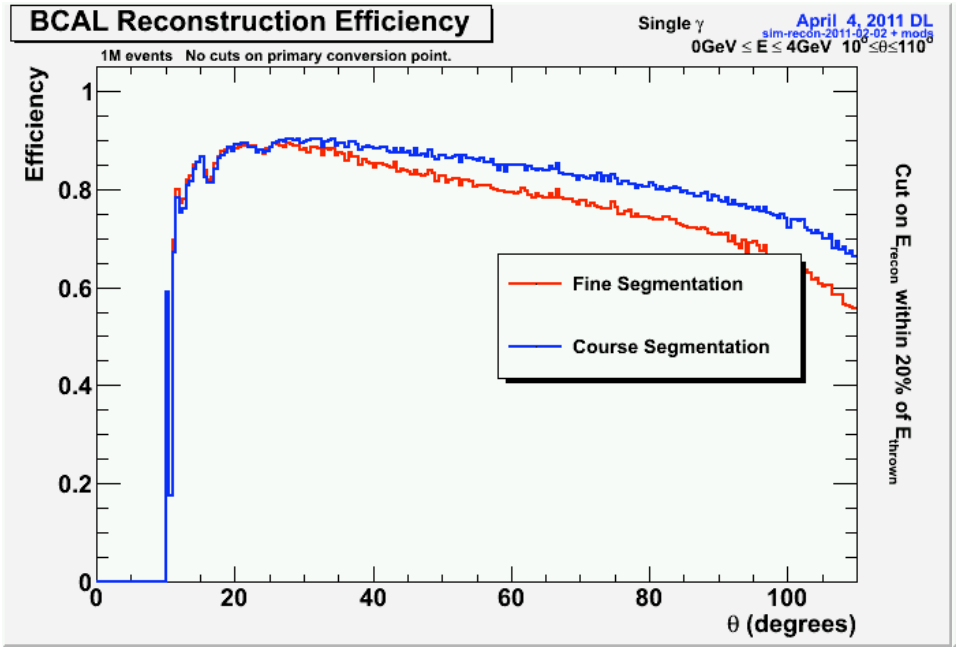


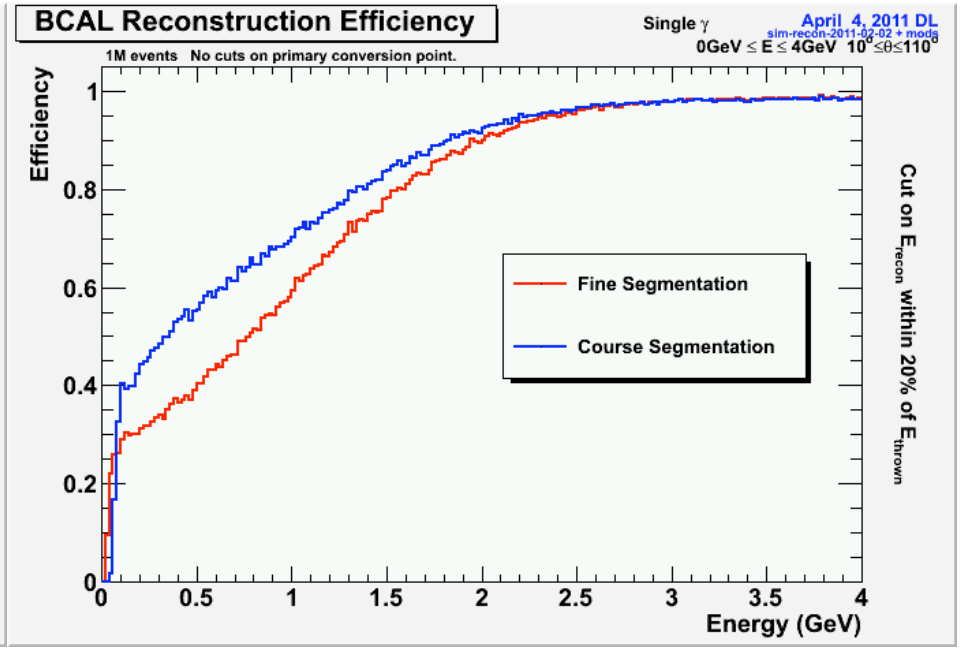
From Andrei's presentation at Mar. 29th meeting



Similar simulation. Fit uses Voigt function (convolution of Breit-Wigner and Gaussian). 95% CL indicates the point where the integral of the fit function is 95% that of the integral out to 10^6.

Efficiency as a function of angle and energy

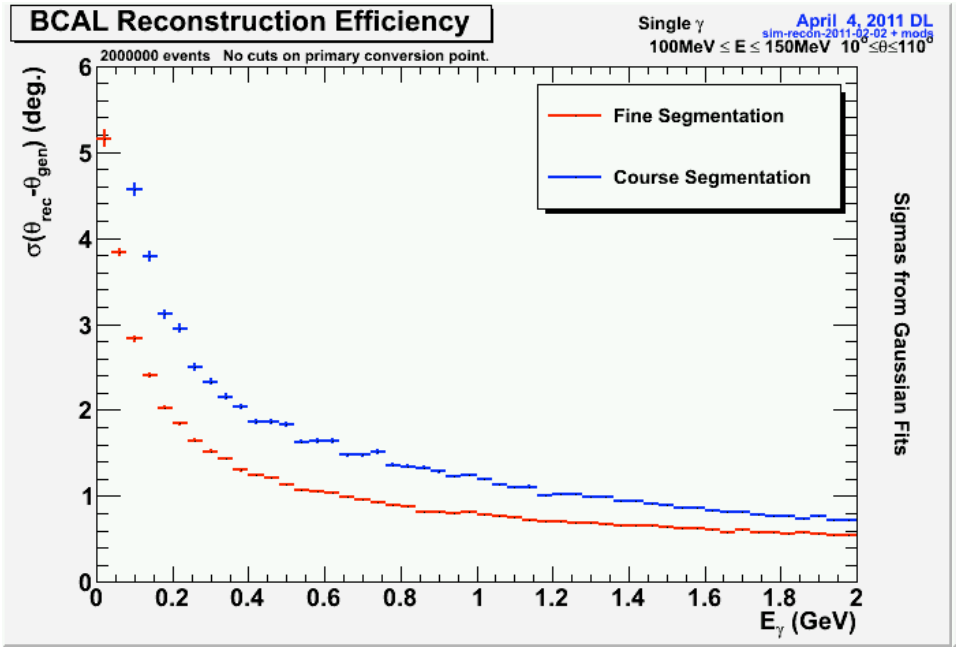




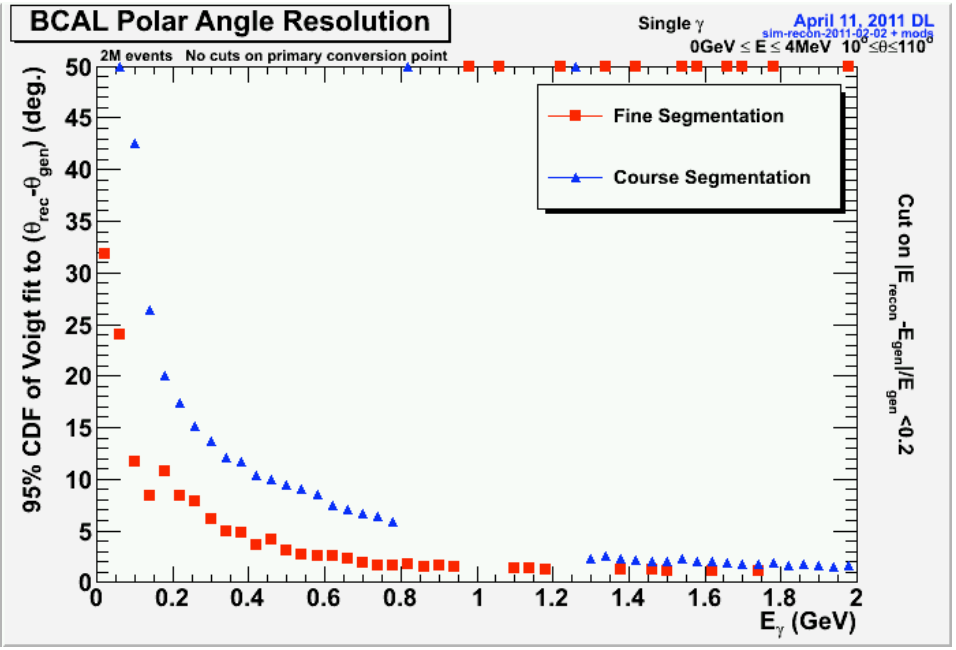
Detection and reconstruction efficiency
- includes acceptance
- reconstructed photon energy within 20% of thrown
- first (not best) reconstructed photon used for 20% cut
- ~95% of events had exactly 1 photon reconstructed

θ resolution as a function of Eγ

From Gaussian Fits



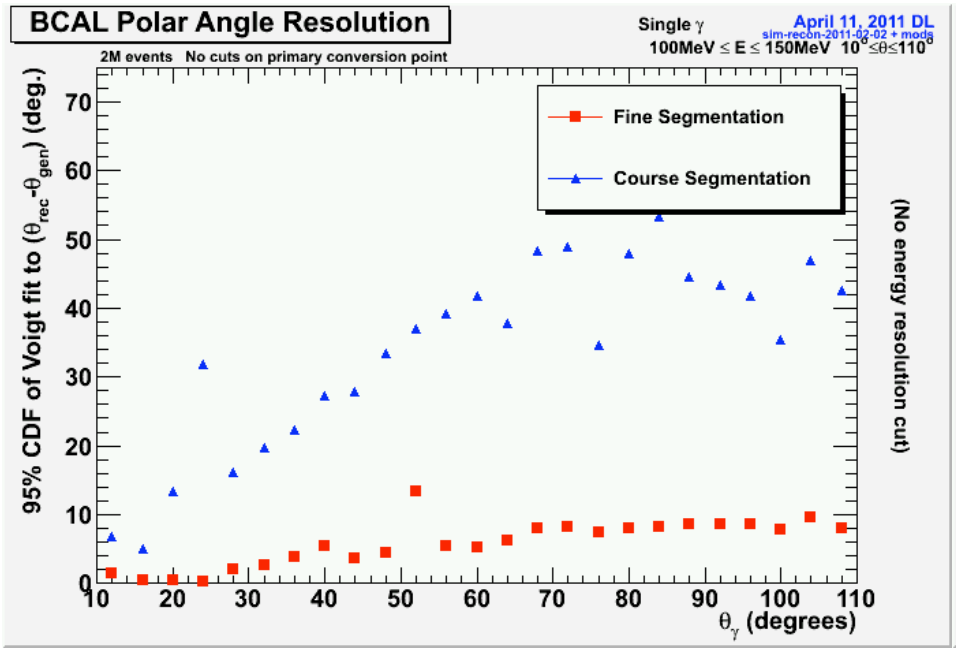
From Voigt Fits



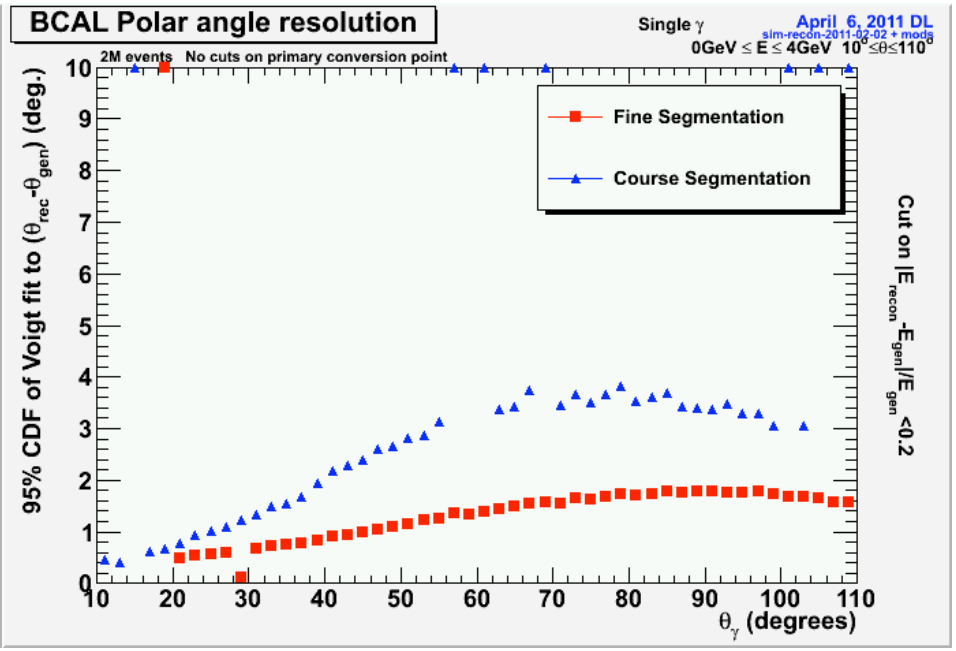
Significant differences in polar angle resolution with strong energy dependence.

θ resolution as a function of θ

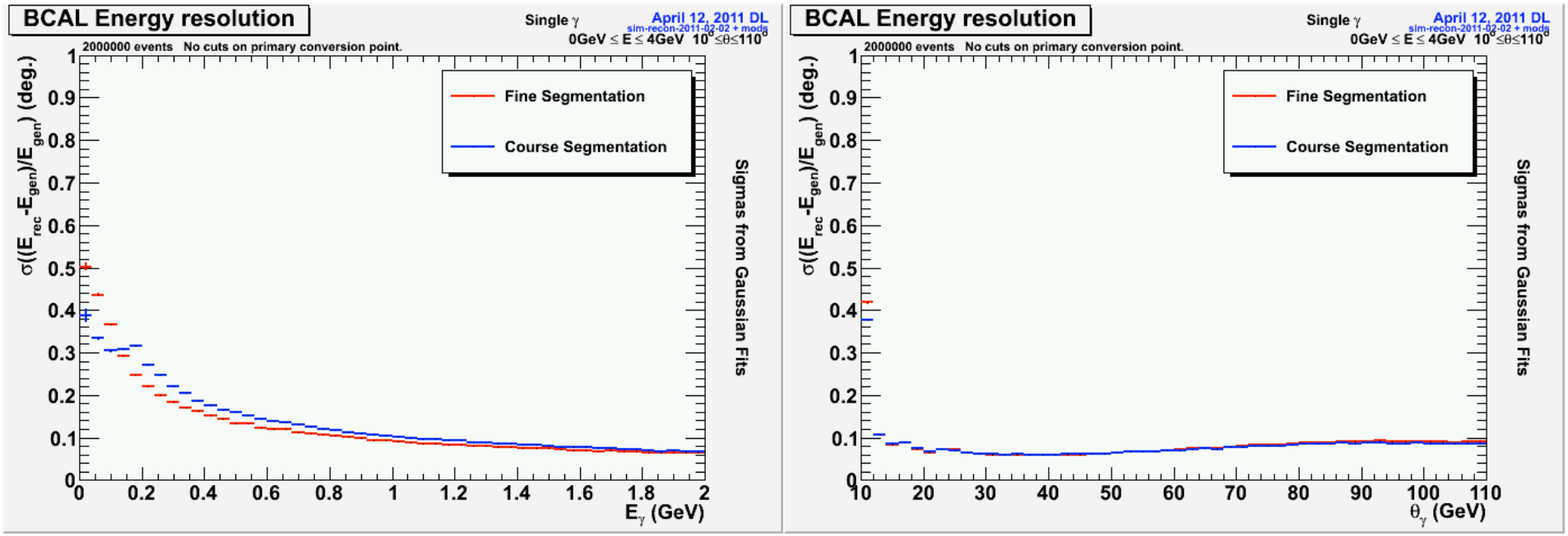
Low energy



All energies



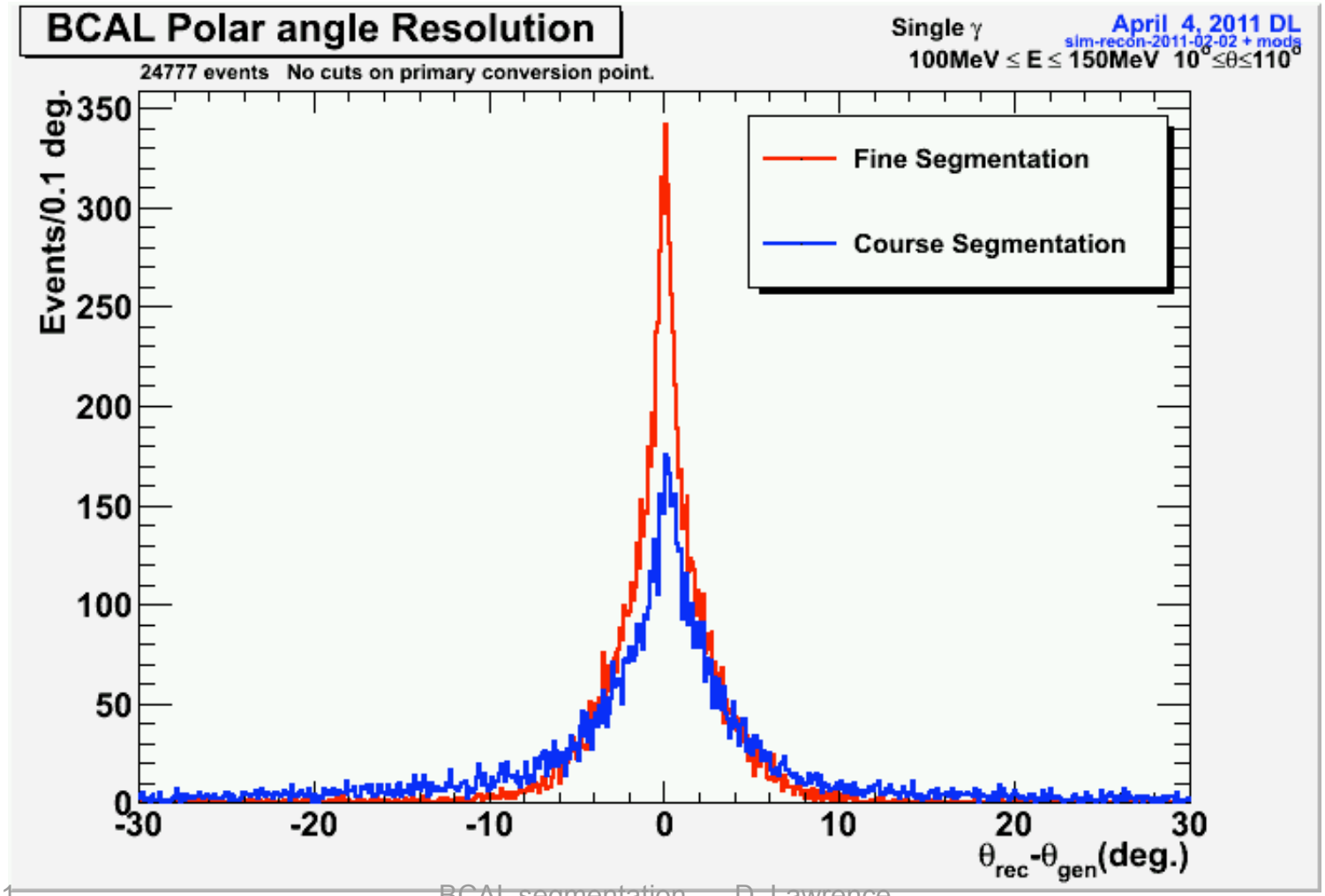
Energy resolution as a function of E and θ



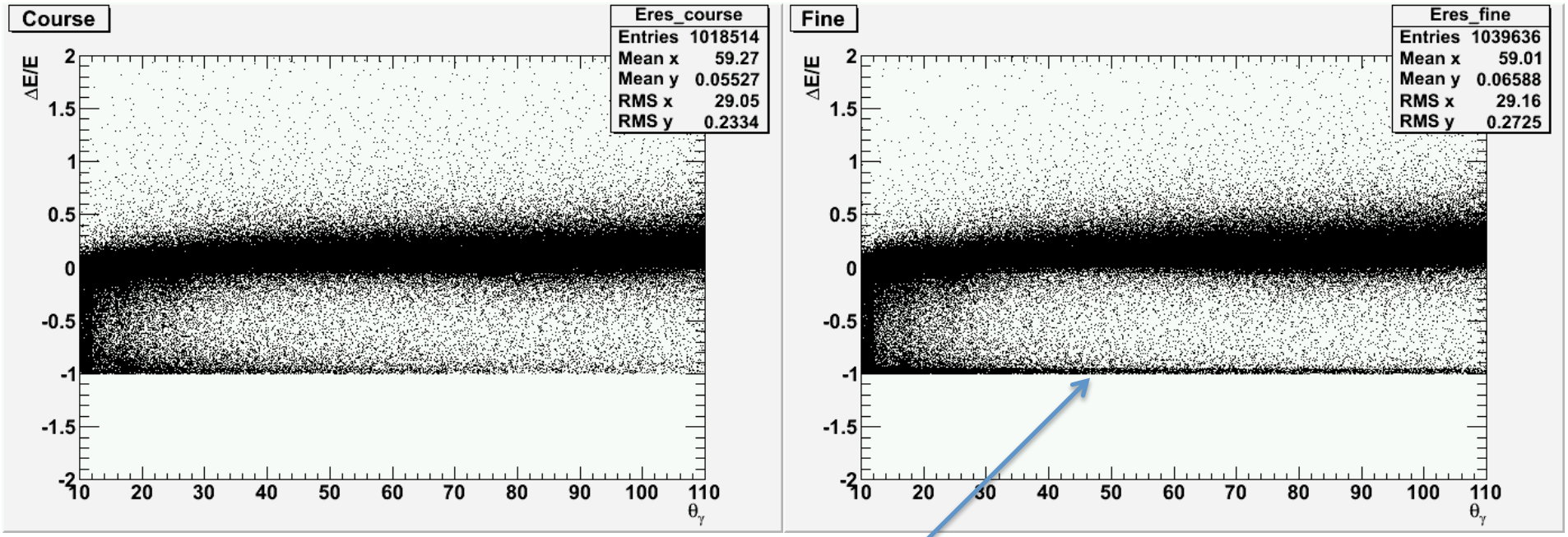
Threshold scaled during smearing by number of SiPMs being added.

Summary

- θ angle resolution appears significantly worse for the course-segmented BCAL readout scheme than for the fine-segmented scheme
- Energy resolution seems roughly the same
- No indication yet whether due to reconstruction algorithm or smearing (dark hits)


BCAL Polar angle Resolution
Single γ
April 4, 2011 DL
sim-recon-2011-02-02 + mods
100MeV ≤ E ≤ 150MeV 10° ≤θ≤110°
24777 events No cuts on primary conversion point.
Events/0.1 deg.
Fine Segmentation
Course Segmentation
θrec-θgen(deg.)

Reconstructed energy difference (relative)



Very low energy photons show up at ~-1

This seems to happen more often for the fine segmetation