

ECL energy resolutions

ECL-IT

8 Ottobre 2015

LNF

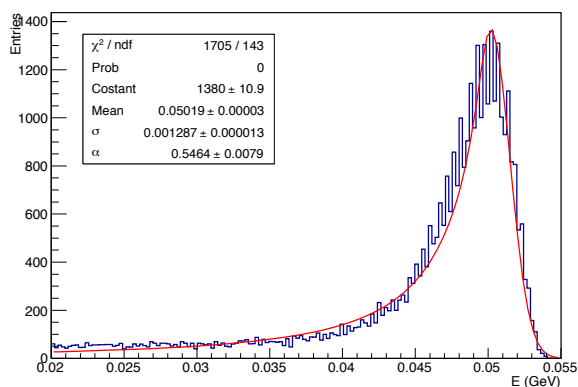
Alessandro, Claudia, Elisa

Samples

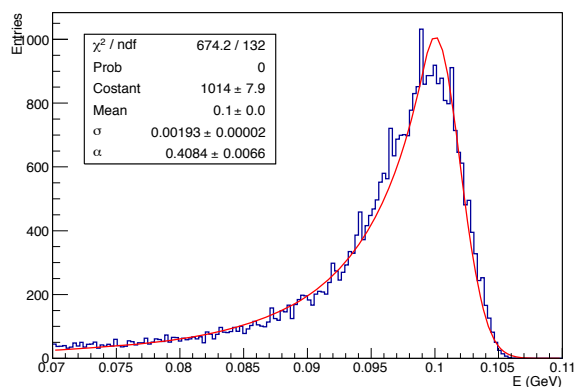
- Code version:
 - w/o bkg: release-00-05-02/
 - w bkg: release-00-05-03/
- single photons generated with particle gun
- Energy:
 - w/o machine bkg: 50/100/200/500/1000 MeV
 - w machine bkg: 100/300/500/700 MeV
- FWD ECL acceptance (as in simulation config files):
'thetaParams': $[12.398^\circ, 31.62^\circ]$ with uniform distribution
- Full Belle-II detector

W/O machine bkg: Crystal Ball fits

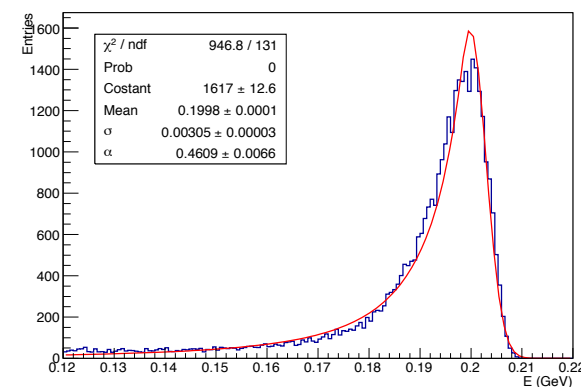
FWD ECL, w/o bkg, $E_{\text{gen}} = 50 \text{ MeV}$



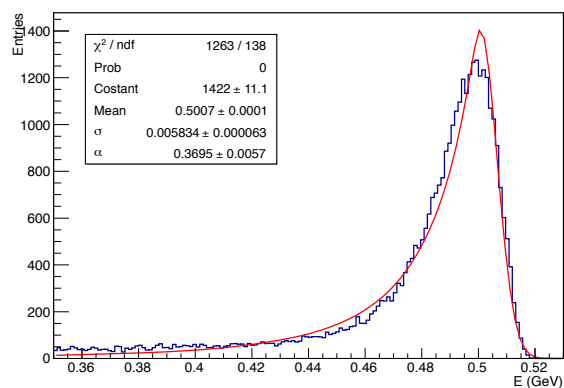
FWD ECL, w/o bkg, $E_{\text{gen}} = 100 \text{ MeV}$



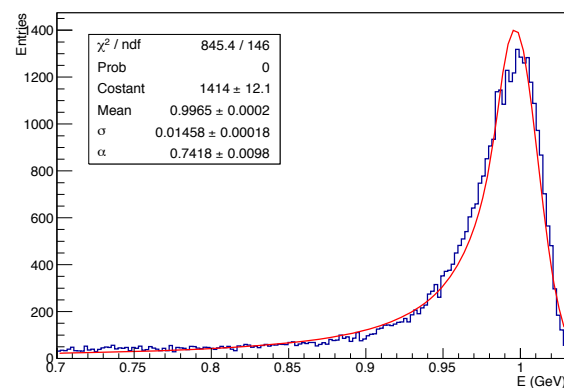
FWD ECL, w/o bkg, $E_{\text{gen}} = 200 \text{ MeV}$



FWD ECL, w/o bkg, $E_{\text{gen}} = 500 \text{ MeV}$



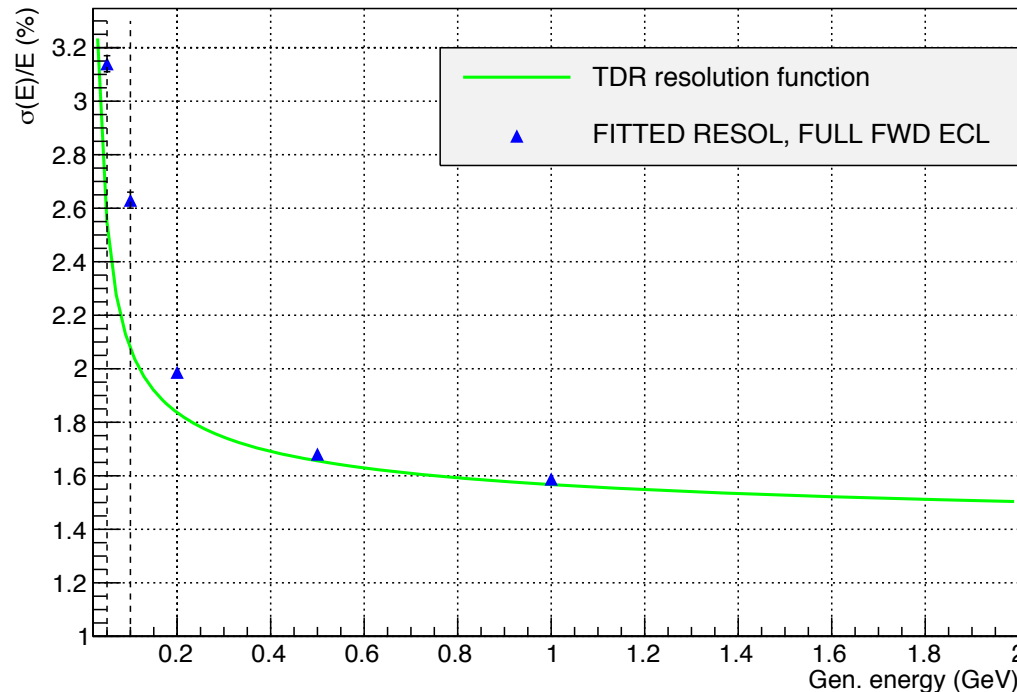
FWD ECL, w/o bkg, $E_{\text{gen}} = 1 \text{ GeV}$



W/O Machine bkg: resolutions



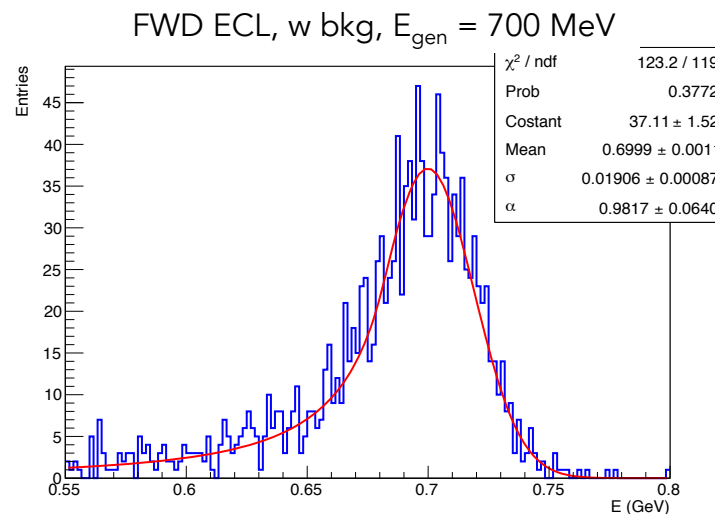
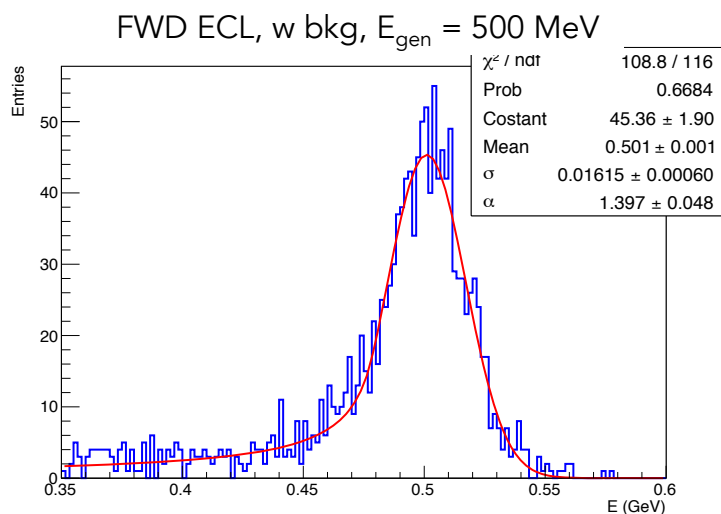
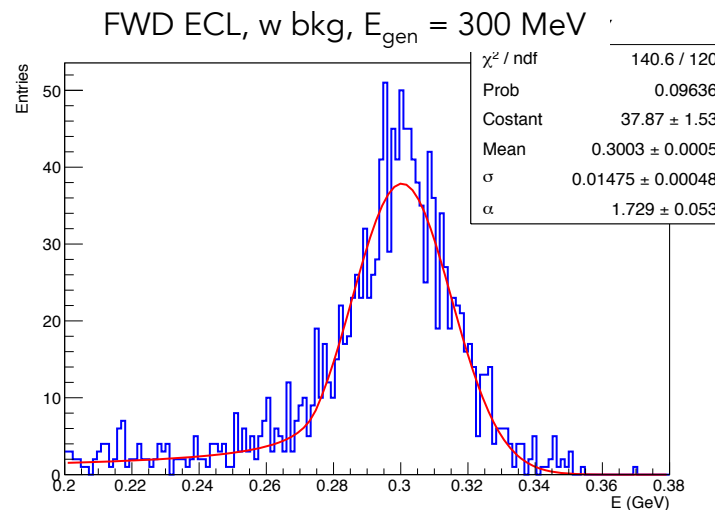
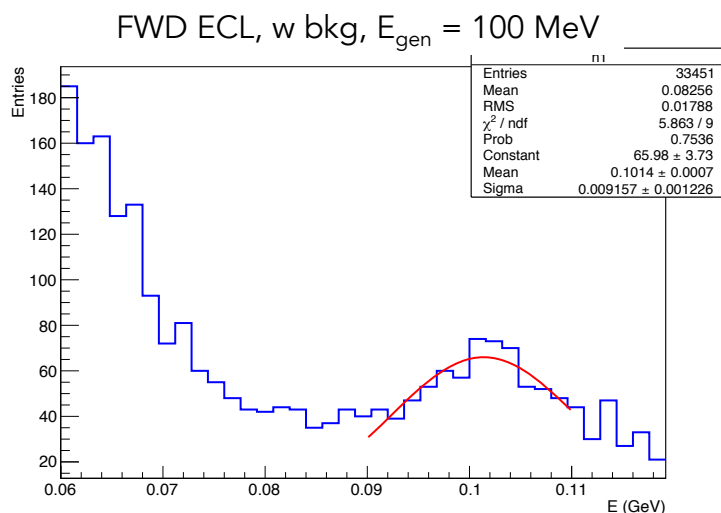
Energy resolution



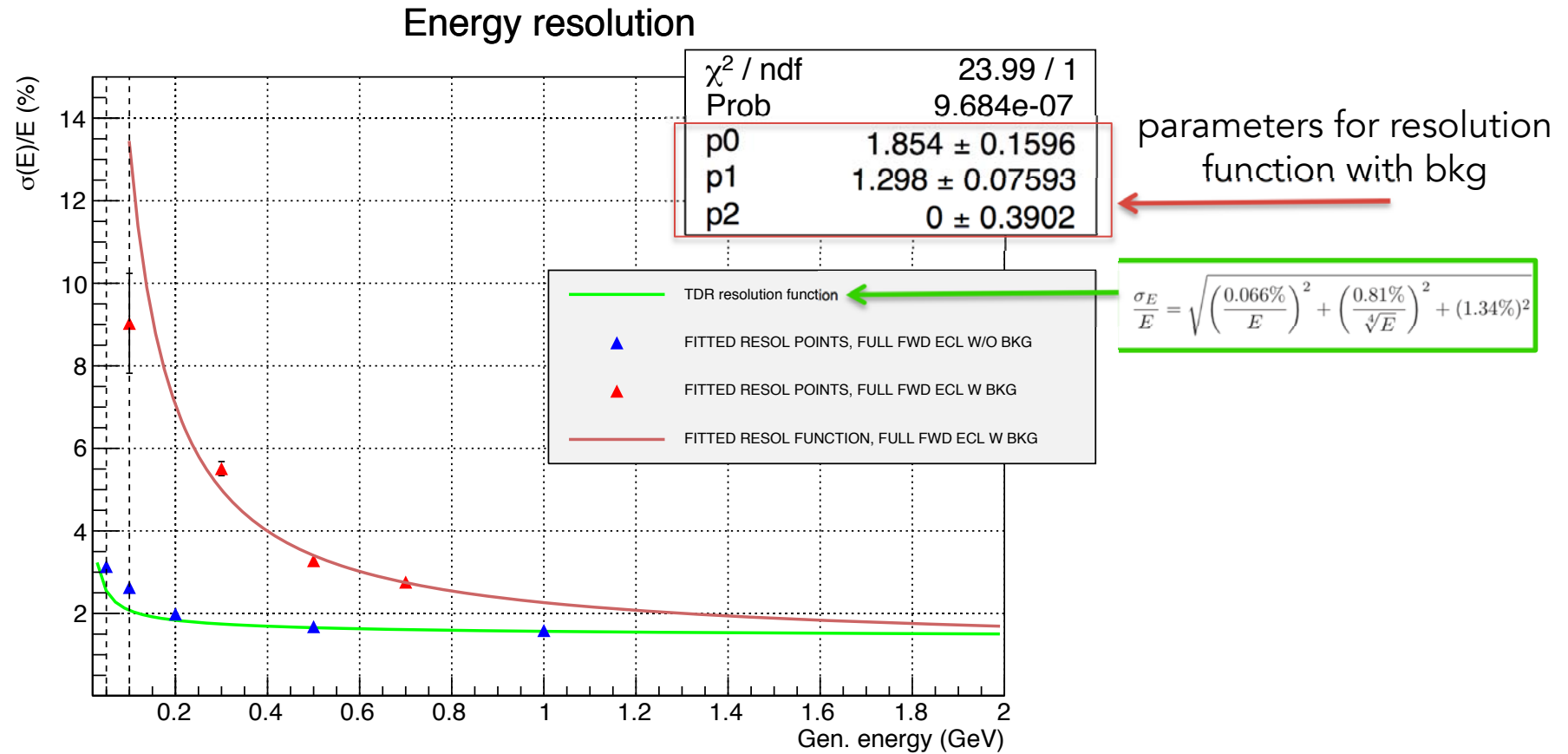
$$\frac{\sigma_E}{E} = \sqrt{\left(\frac{0.066\%}{E}\right)^2 + \left(\frac{0.81\%}{\sqrt[4]{E}}\right)^2 + (1.34\%)^2}$$

- fitted points: small stat errors from CB fits
 - add syst or try Novosibirsk fit for more reliable uncertainties
- fitted reso compatible with expectation below 200 MeV
- resolutions at 100 and 50 MeV far from expectations
 - 50 MeV: fitted reso = $(3.14 \pm 0.03) \%$ vs exp reso = 2.54 %
 - 100 MeV: fitted reso = $(2.63 \pm 0.03) \%$ vs exp reso = 2.07 %

W machine bkg: Crystal Ball fits



With Machine bkg: resolutions



Summary table & plots [CsI (TL)]

Gen. En. (MeV)	Energy Resolution (%)	
	w/o mach. bkg	w mach. bkg
50	3.14 ± 0.03	
100	2.63 ± 0.03	9.03 ± 1.21
200	1.987 ± 0.020	
300		5.51 ± 0.17
500	1.681 ± 0.020	3.28 ± 0.09
700		2.76 ± 0.09
1000	1.588 ± 0.015	

