

RICH GEMC SIMULATIONS

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INFN Ferrara

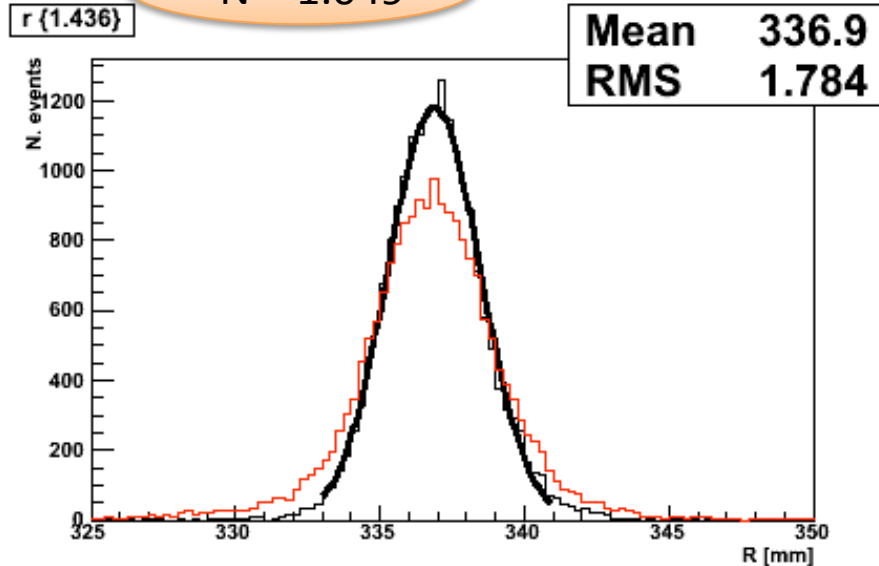
Rich Meeting, 15 February 2013

Simulation Optimization

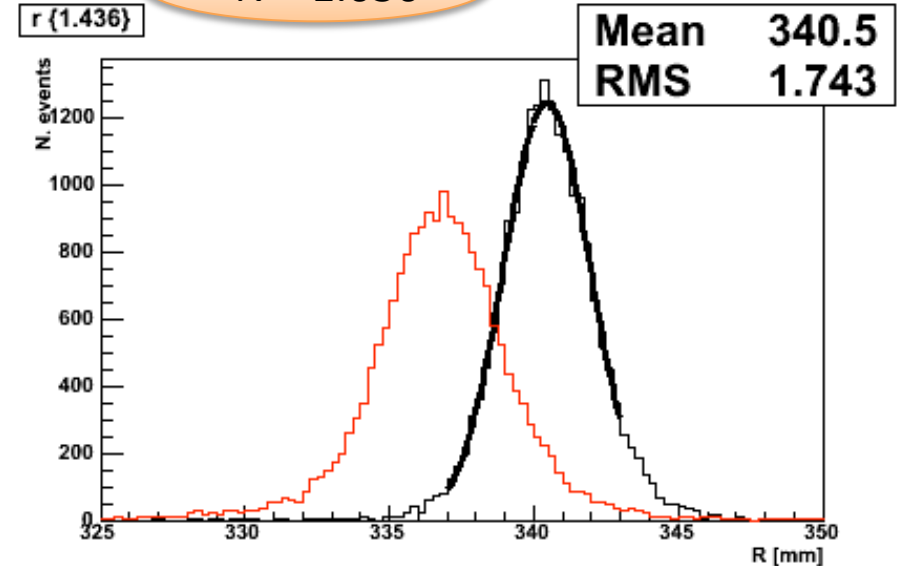
- ✓ Geometry
 - ✓ beam trajectory taken from GEMs
 - ✓ box 0.5 degrees rotation with respect to the beam
- ✓ Aerogel optical properties
 - ✓ measured transmission
 - ✓ refractive index
 - ✓ measured dispersion (direct light data with filters)
- ✓ MA-PMTs digitalization
 - ✓ dead area
 - ✓ double hits → take the OR
 - ✓ PMTs global efficiency
 - ✓ cross-talk
 - ✓ gain

Mean Radius

N = 1.049



N = 1.050

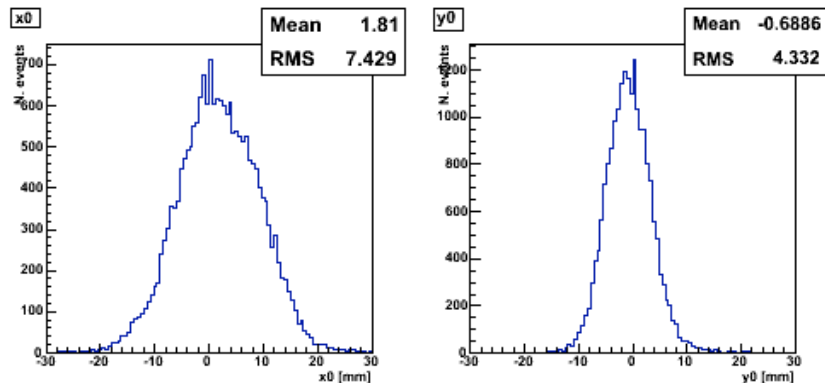
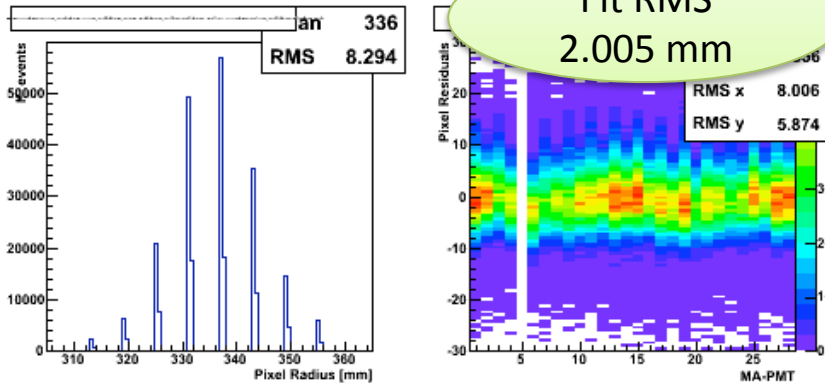
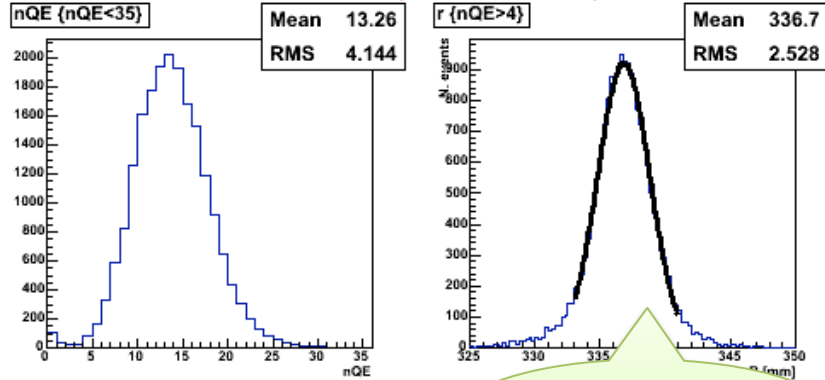


Novosibirsk defines: n^2 (at 400 nm) = $1 + 0.438 * \rho$

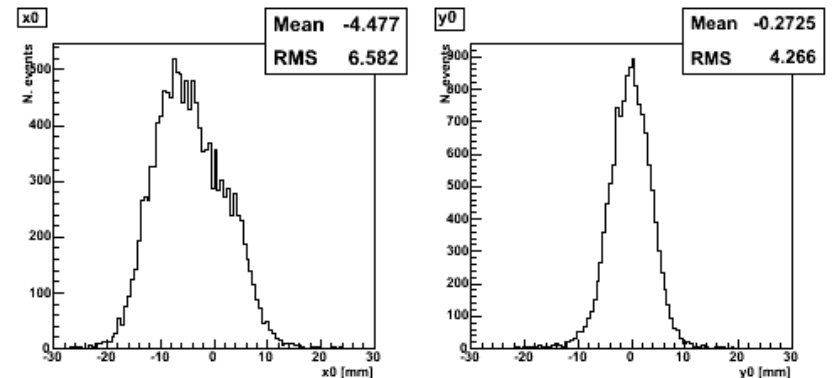
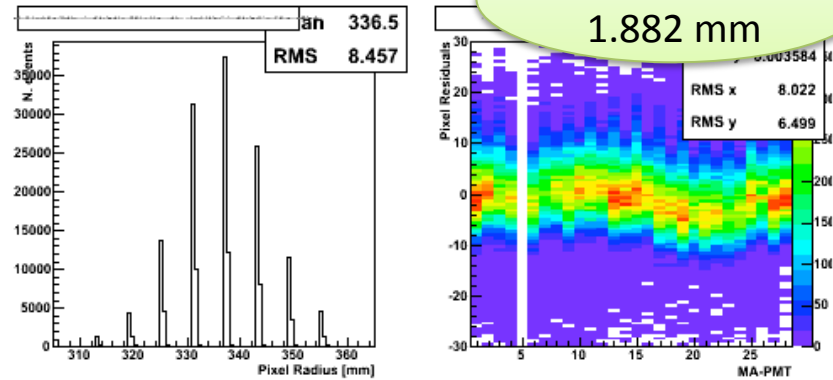
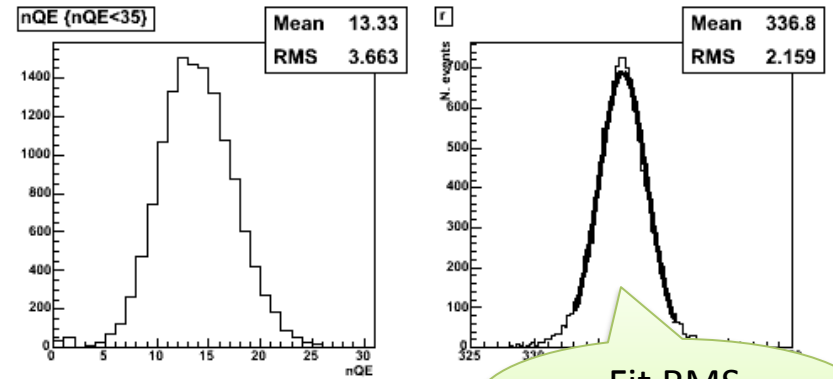
The tile used has $\rho = 0.230 \text{ g/cm}^3 \rightarrow n = 1.0492$

DATA vs MC with Misalignment+Eff

DATA (Run 1051)



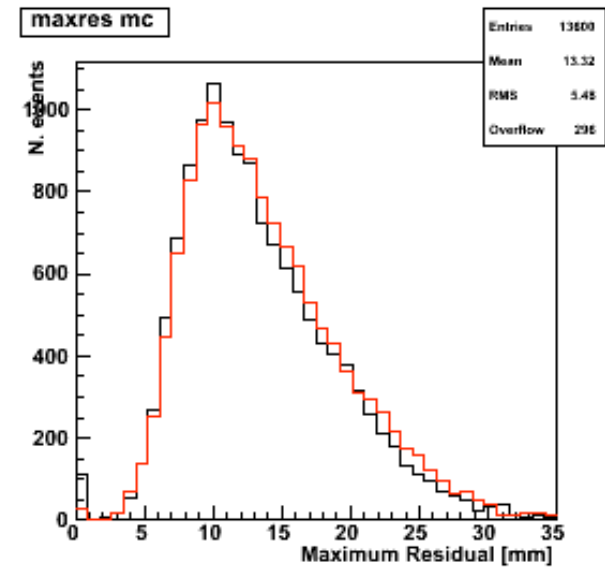
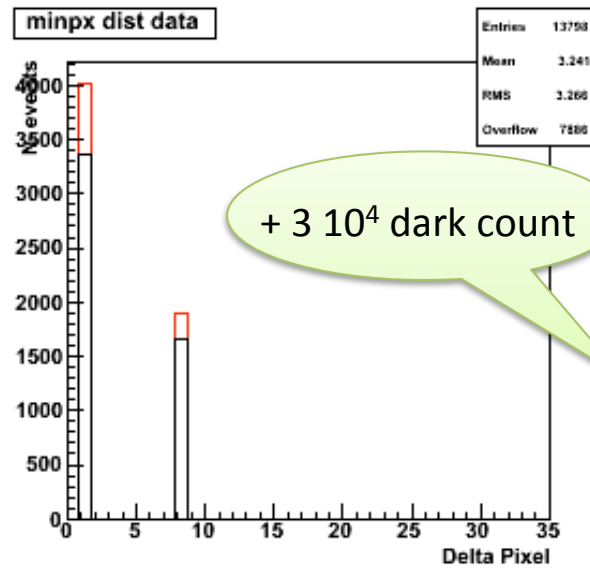
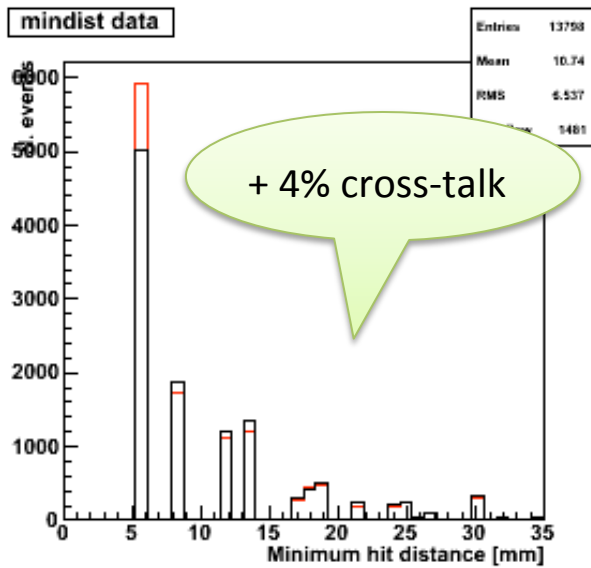
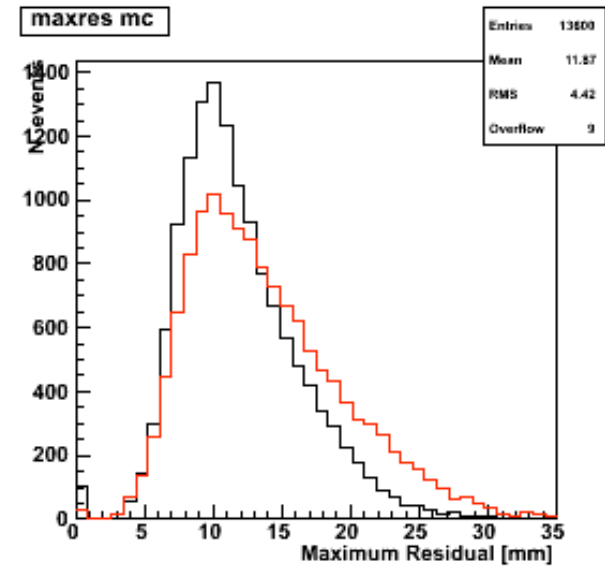
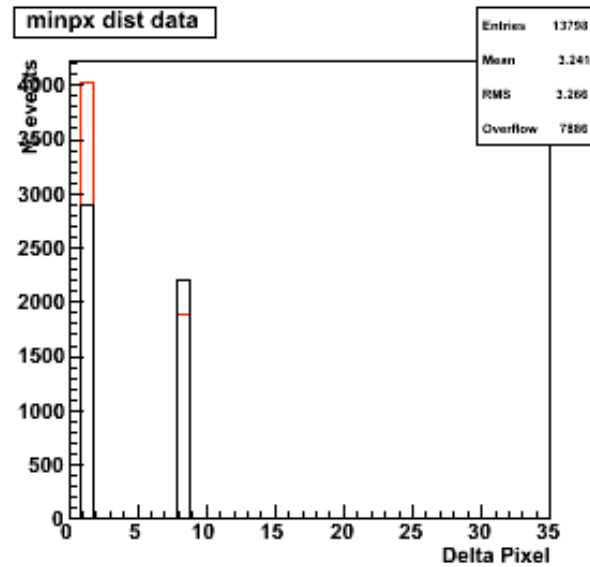
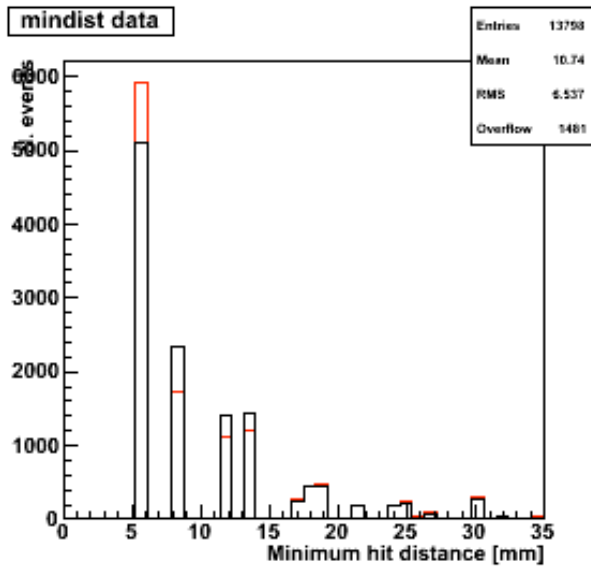
MC (Aram GEM values + 0.5 rndm)



Fit RMS
2.005 mm

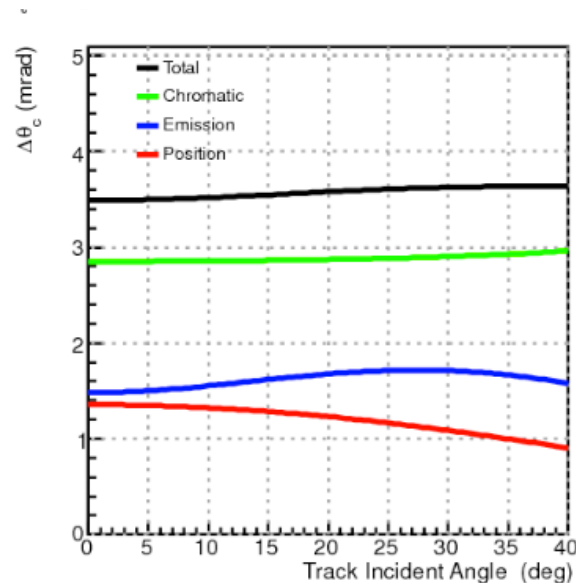
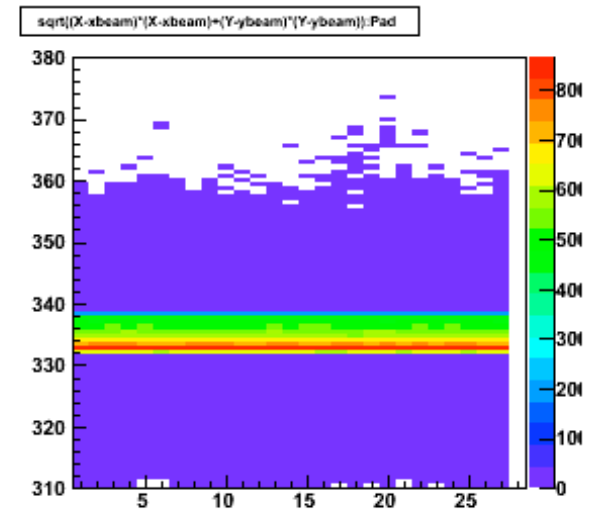
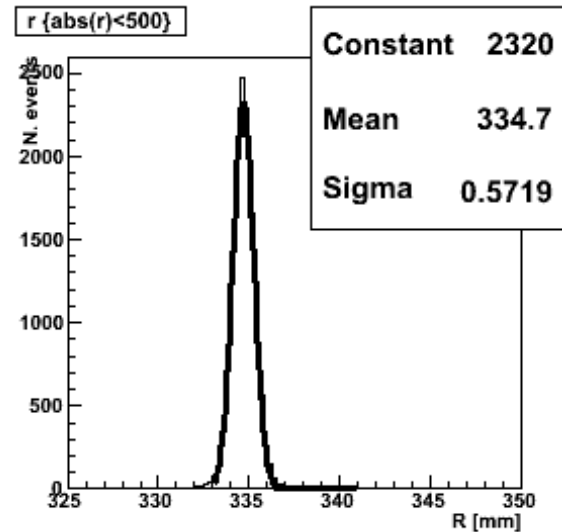
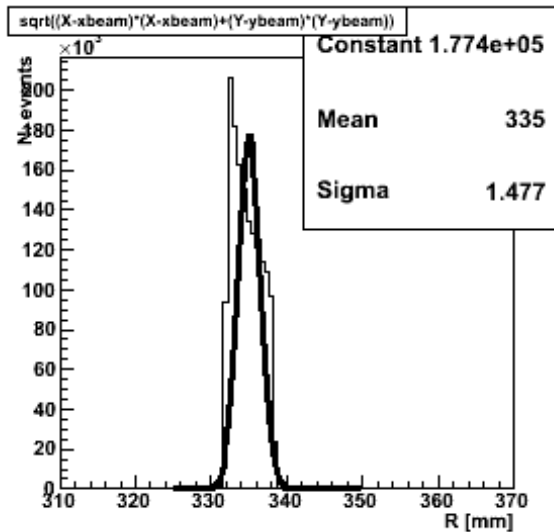
Fit RMS
1.882 mm

Background Hits



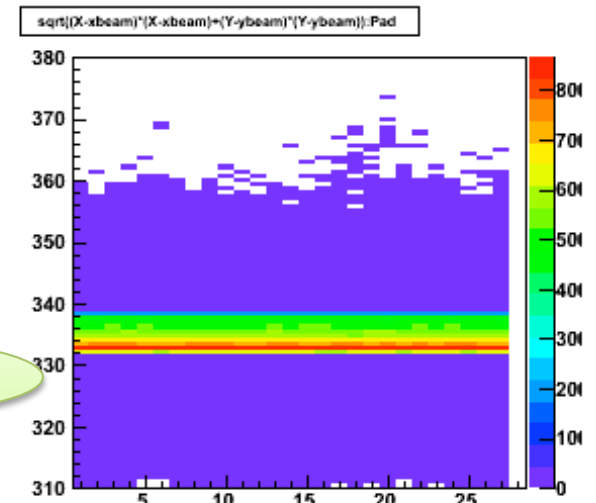
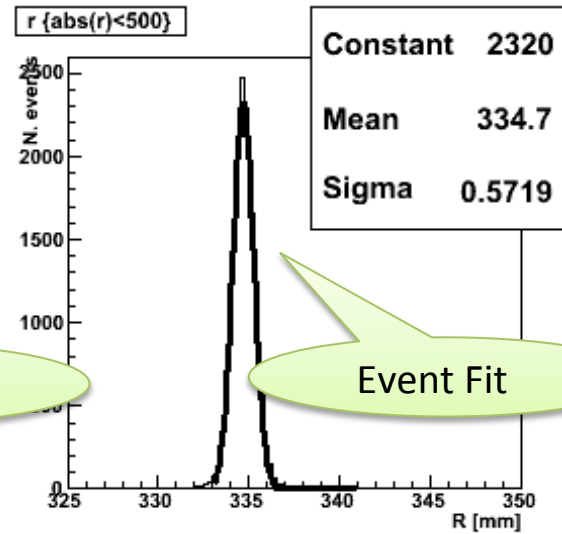
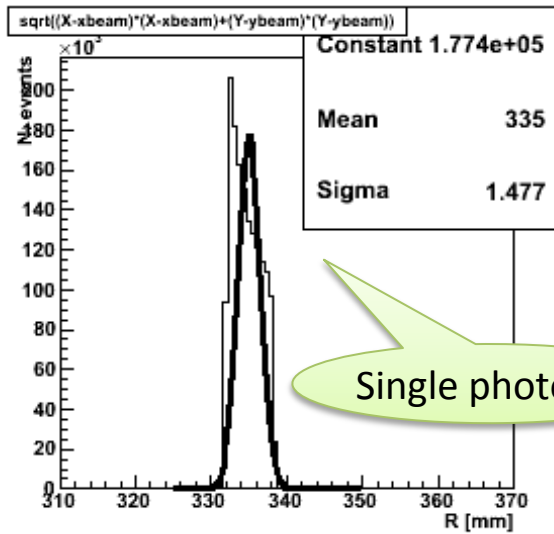
Single photon Cherenkov-angle resolution

From photon emission point 1.5 mrad

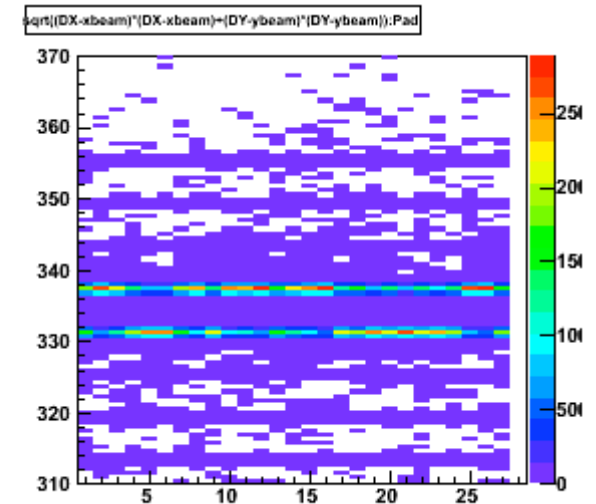
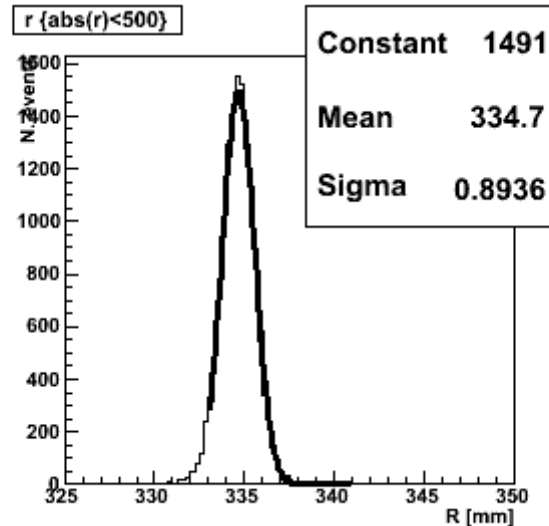
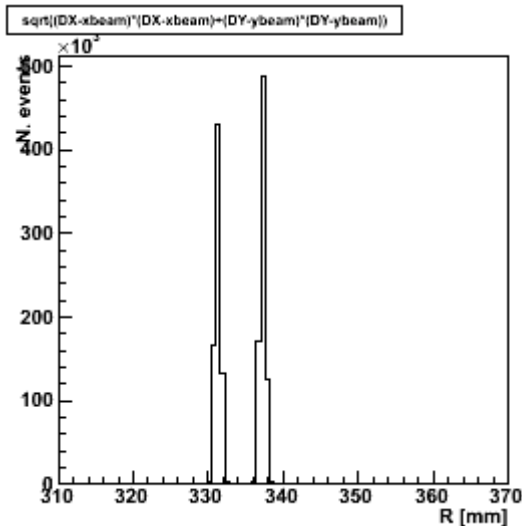


Cherenkov-angle resolution

From photon emission point 1.5 mrad

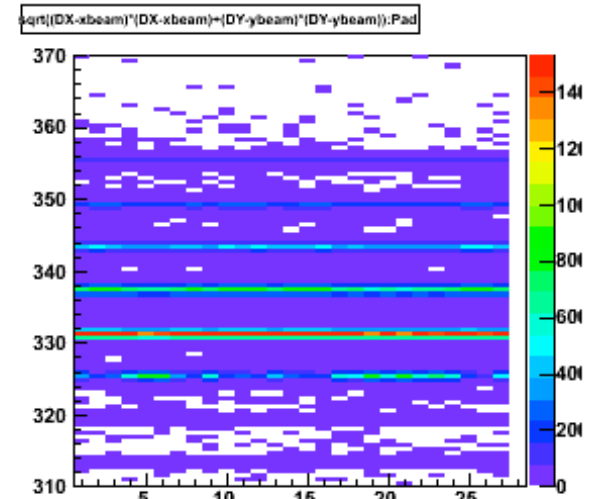
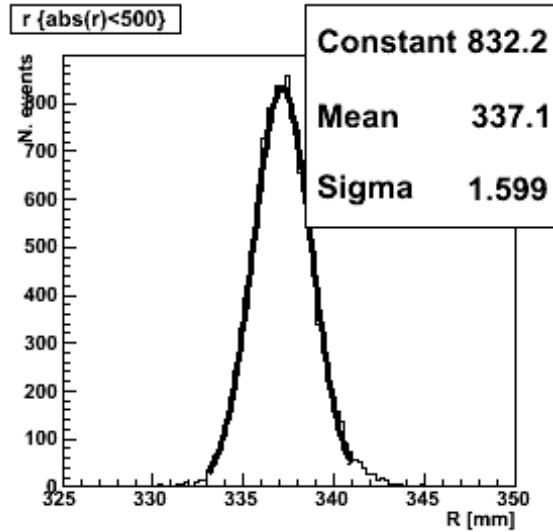
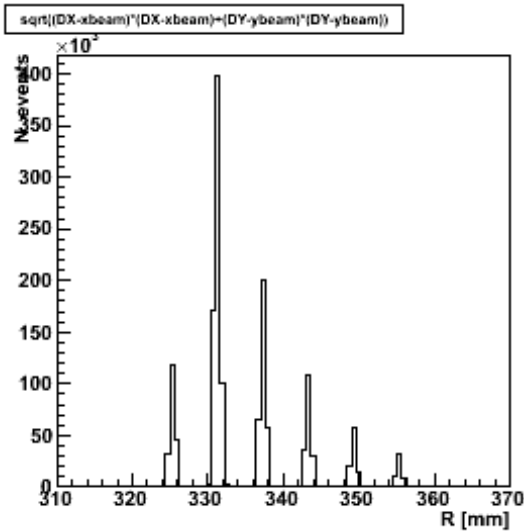


Plus digitalization: 0.6 mrad

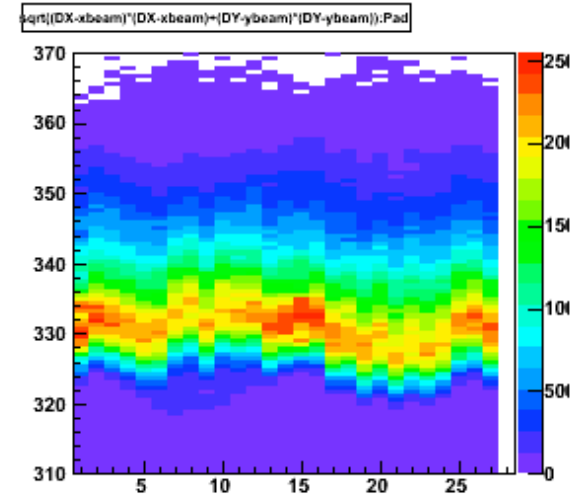
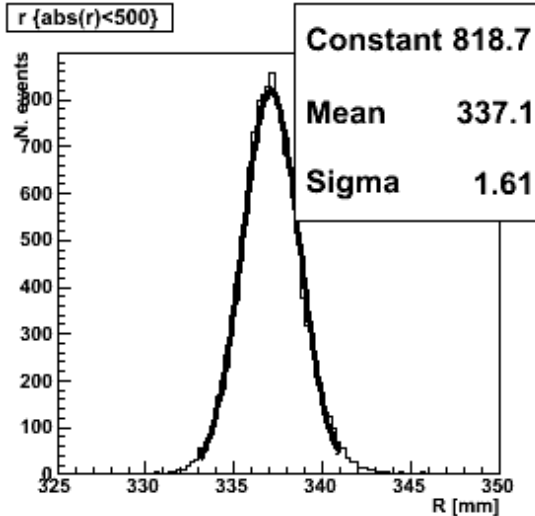
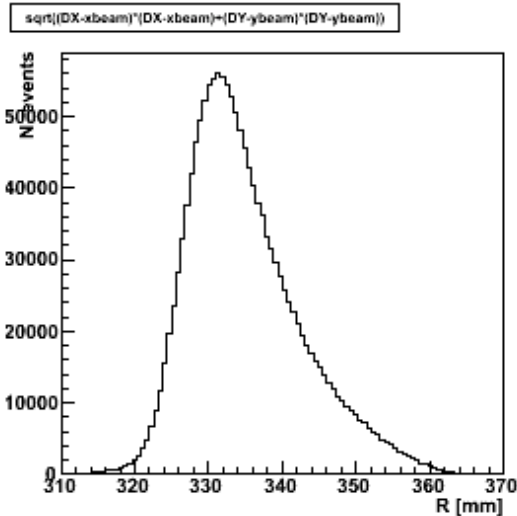


Single photon Cherenkov-angle resolution

Plus dispersion: 0.6 mrad

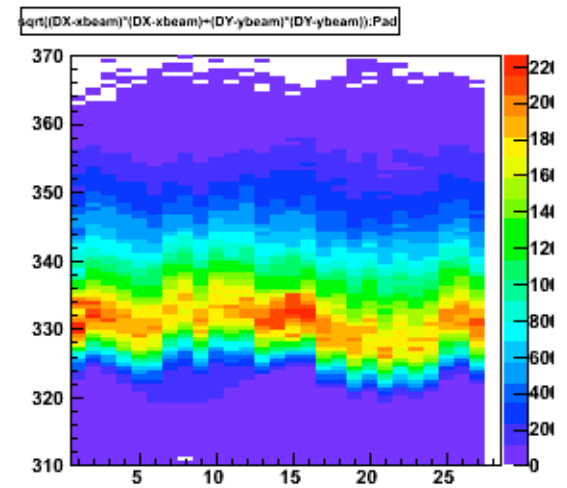
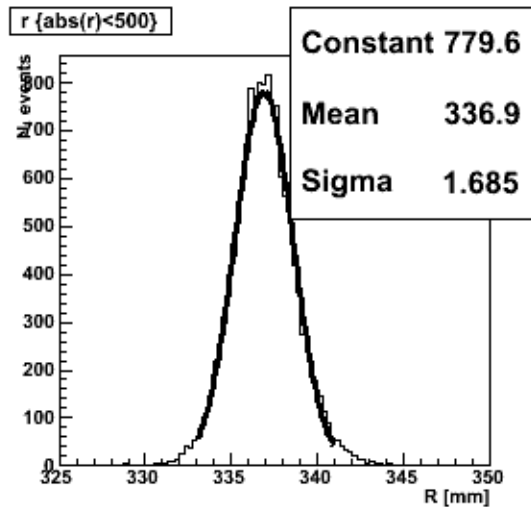
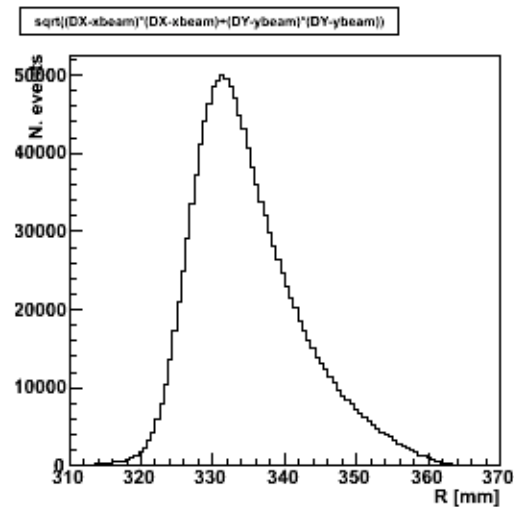


Plus misalignment: 0.6 mrad



Single photon Cherenkov-angle resolution

Plus 4% cross-talk: 0.6 mrad



Plus 3×10^4 dark count: 0.6 mrad

