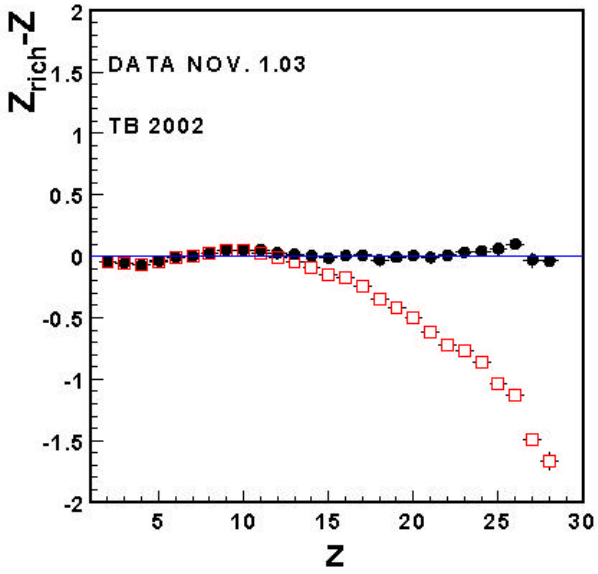
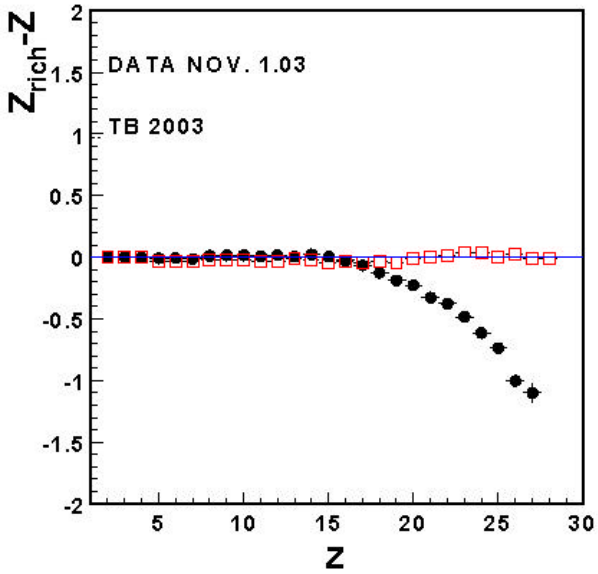
PMT Linearity

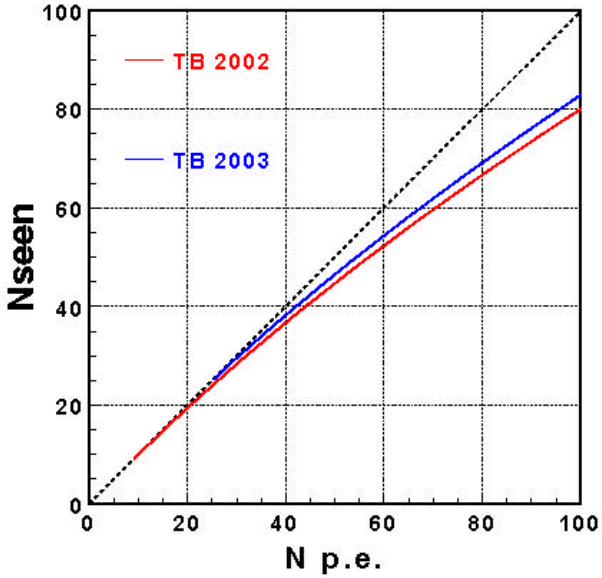
On TB2002 data, it was shown how a single correction applied on the PMT response for the channels associated to the reconstructed ring is able to correct the shift on the charge peak position clearly visible for Z>15





The same fact holds on the TB2003 data sample

The effective parameterization of the PMT non linearity in terms of photoelectrons shows a slight but significant improvement wrt TB2002. This is even less obvious when one takes into account that the PMT gain has been increased (peaking time fixing) by a non negligible amount. One should seriously consider the FE chip as the origin for this effect.

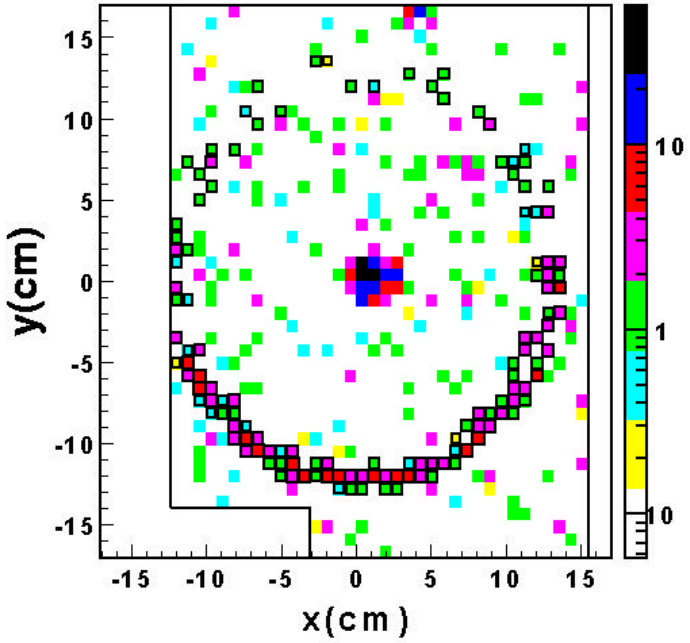


A new measurement of the PMT and FE chip linearity would be thus very useful

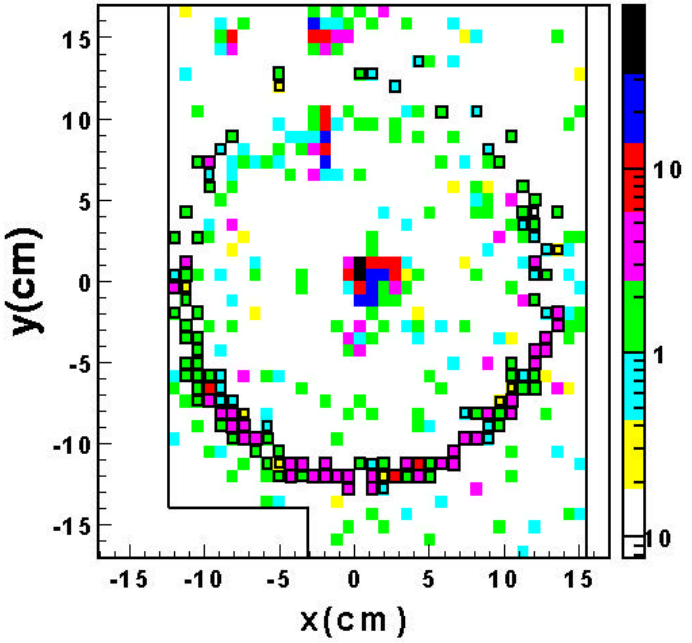
NOV 1.05: SCAN RUNS

SCAN runs for NOV105 aerogel are not very promising to check the uniformity of this radiator. The very limited size of the AGL piece seems to be the origin of a modification in the observed ring pattern. In several runs (see 551, 553 below) the effect is clearly visible as missing part in the Cerenkov ring. In others, even though the effect is not so evident, the photon yield shows a suspicious azimuthal dependence structure still to be clarified.

RUN 551

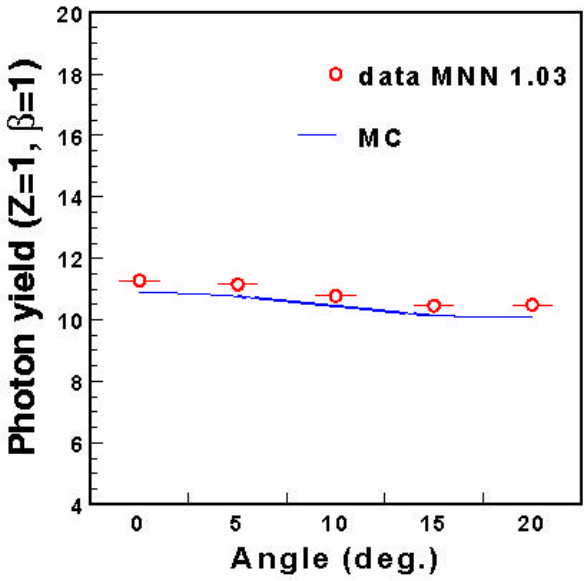


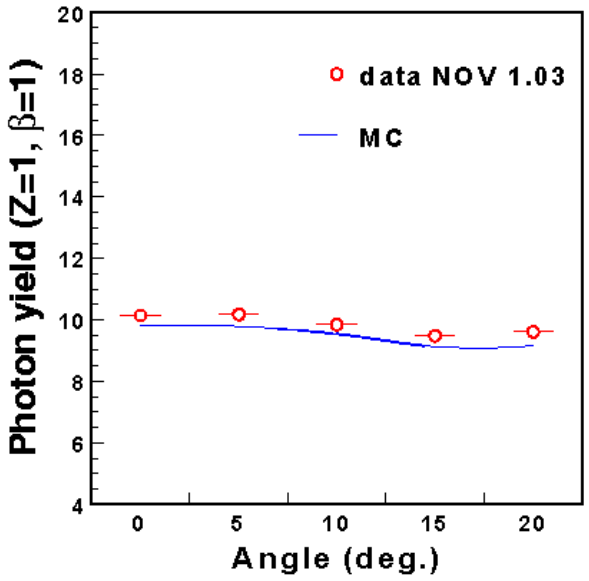
RUN 553

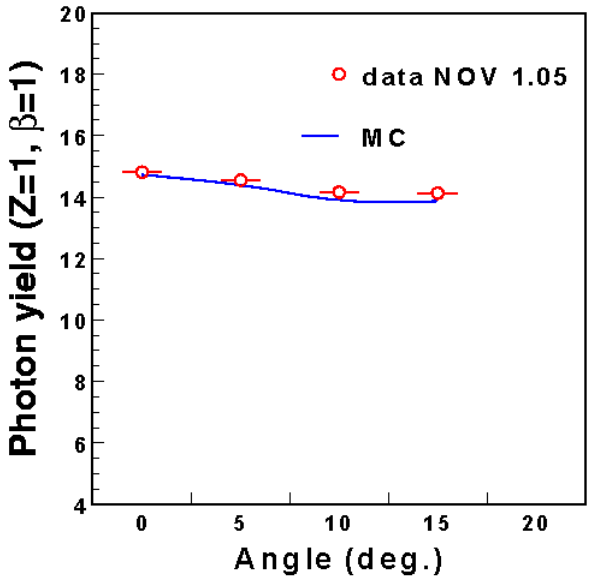


ANGLE RUNS: Photon Yield

The computation of the photon yield (expected number of detected photoelectrons in the ring for a Z=1 particle) shows a smooth angular dependence for MNN103, NOV103 and NOV105 radiators when corrected to fully contained rings.
The difference in photon yield for the three aerogels is due to the different refractive index and optical quality of the radiators.

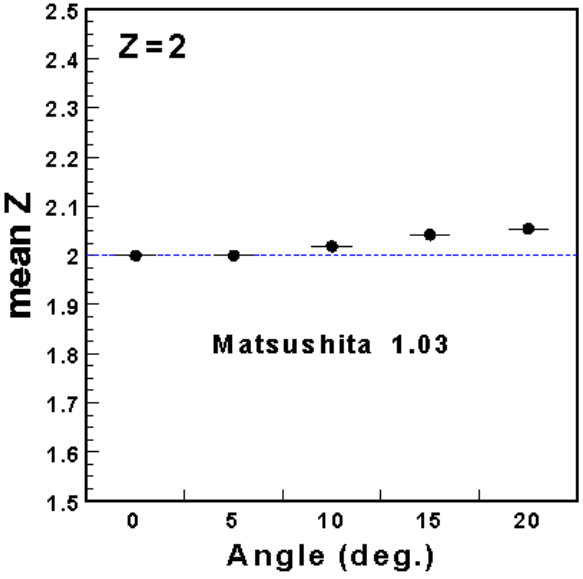


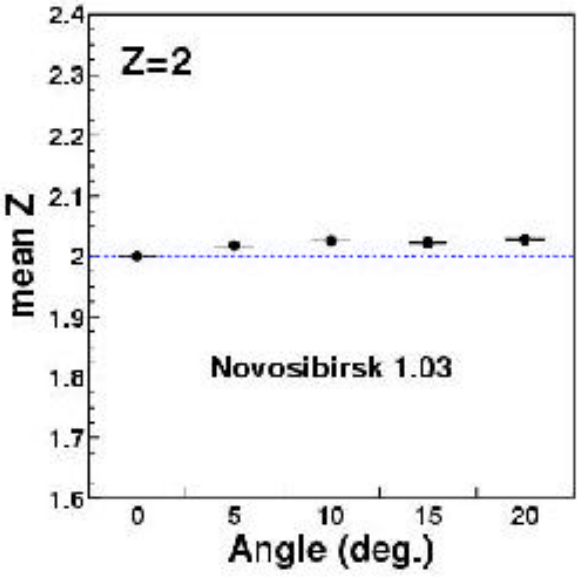


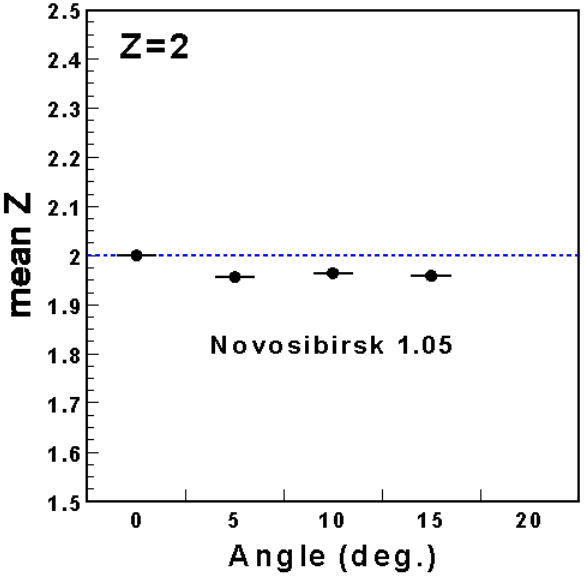


ANGLE RUNS: Charge Bias

The Helium peak position is shown to be independent of the beam angle with respect to the prototype within a 2-3% for the three AGLs. The photon yield is thus understood at the level of a 4-6% for these radiators.

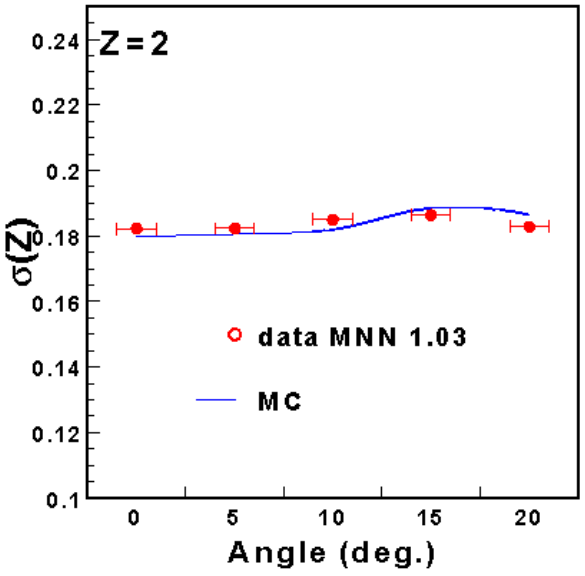


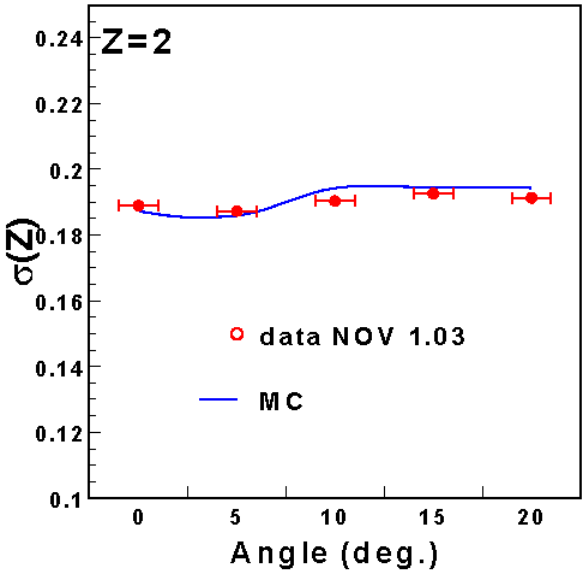


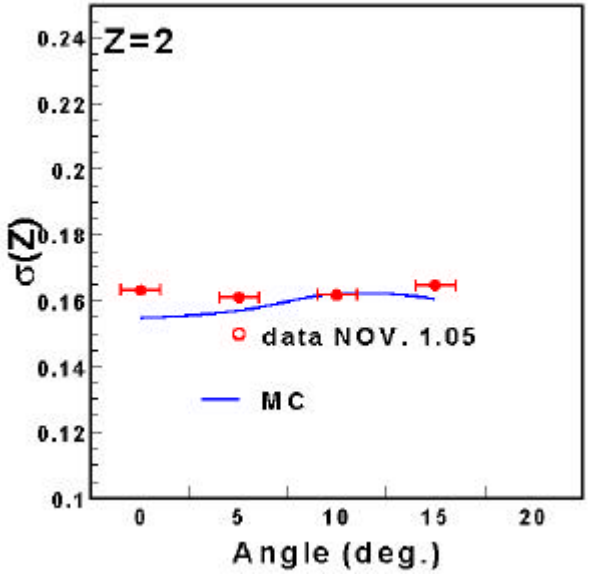


ANGLE RUNS: Charge Resolution

The Helium charge resolution is nearly independent of the beam incident angle, as expected from slight photon yield dependence, and in good agreement with the MC expectations.
The difference between the n=1.05 and n=1.03 radiators is due to its higher photon yield







- Most probably due to the small size of the NOV105 sample used in TB2003, the uniformity of this aerogel can be hardly checked from the scan runs
- The preliminary analysis of the NOV105 runs with angles indicates a good behavior for what concerns charge reconstruction (He peak position and resolution)
- As a preliminary conclusion we can claim that the aerogels MNN103, NOV103 and NOV105 show no remarkable difference regarding uniformity (when testable) and angular dependence of the photon yield
- The biggest discrepancies wrt the expected behavior with incident angle are at the level of a 5% in photon yield
- Only small differences are expected after the new production (including new track prediction, better understanding of the pivot point for runs with angle…)