

Direct Coupling

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Basic Questions

If feasible fiberless coupling of photosensor to scintillator can simplify design, assembly and construction of a scintillator HCAL.

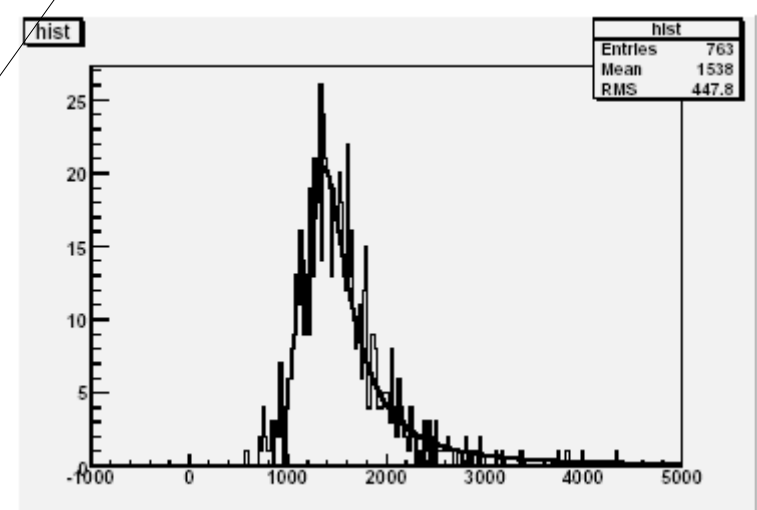
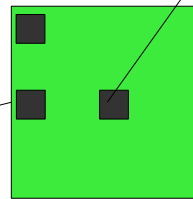
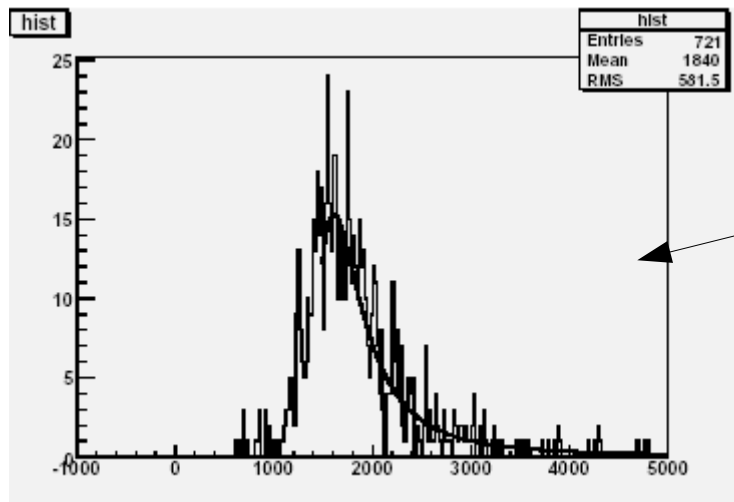
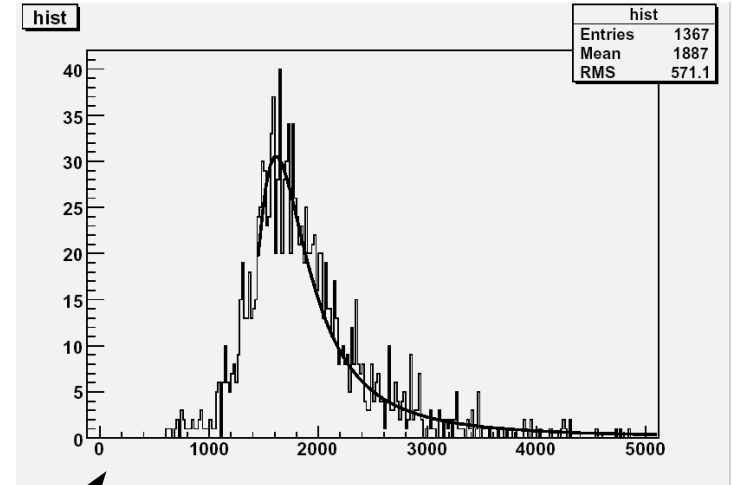
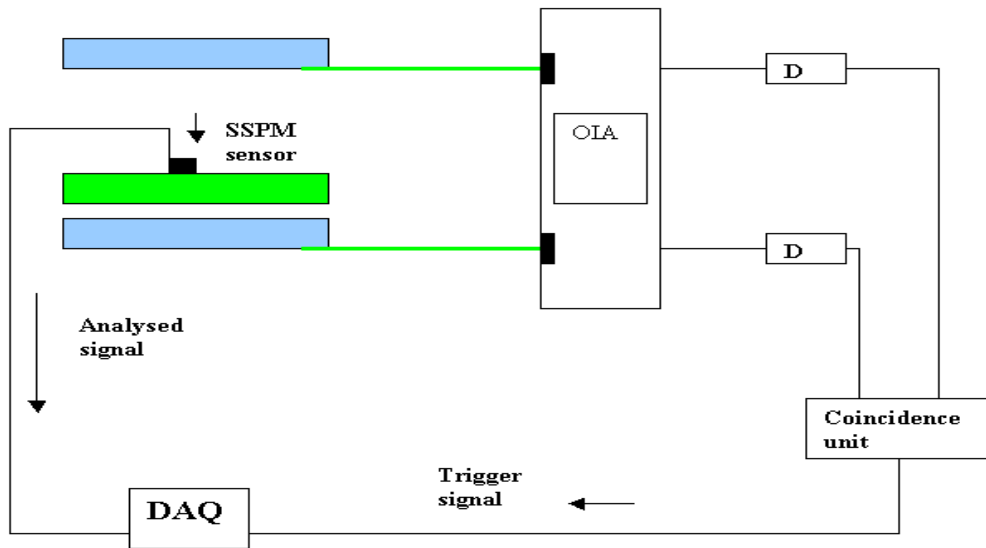
Is there enough response?

- cosmics

Is the response uniform enough?

- source scans

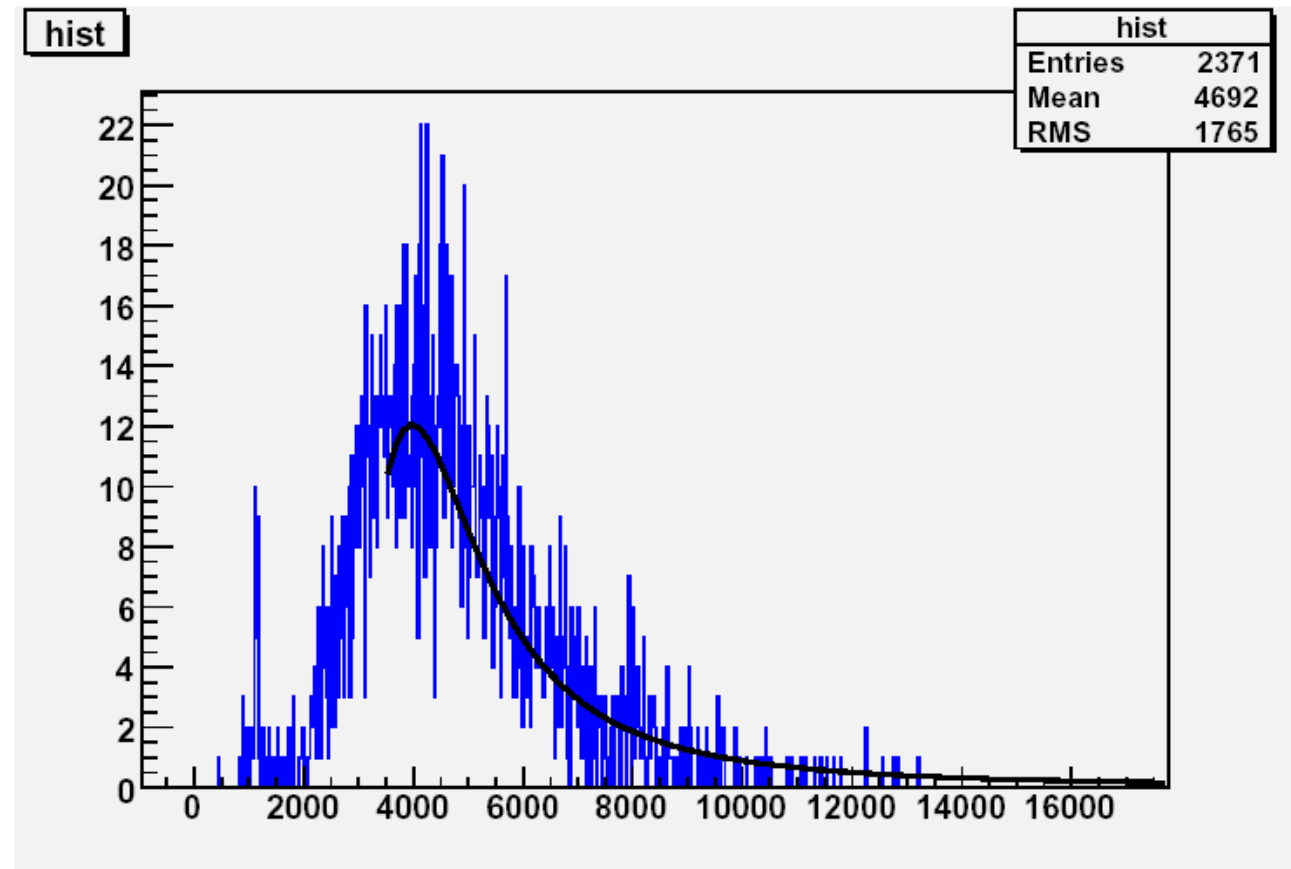
Response with directly-coupled CPTA devices



Response w/ directly coupled Hamamatsu devices

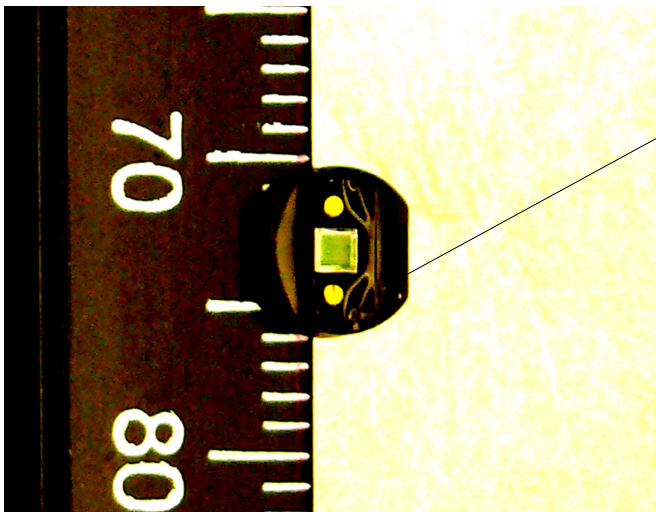
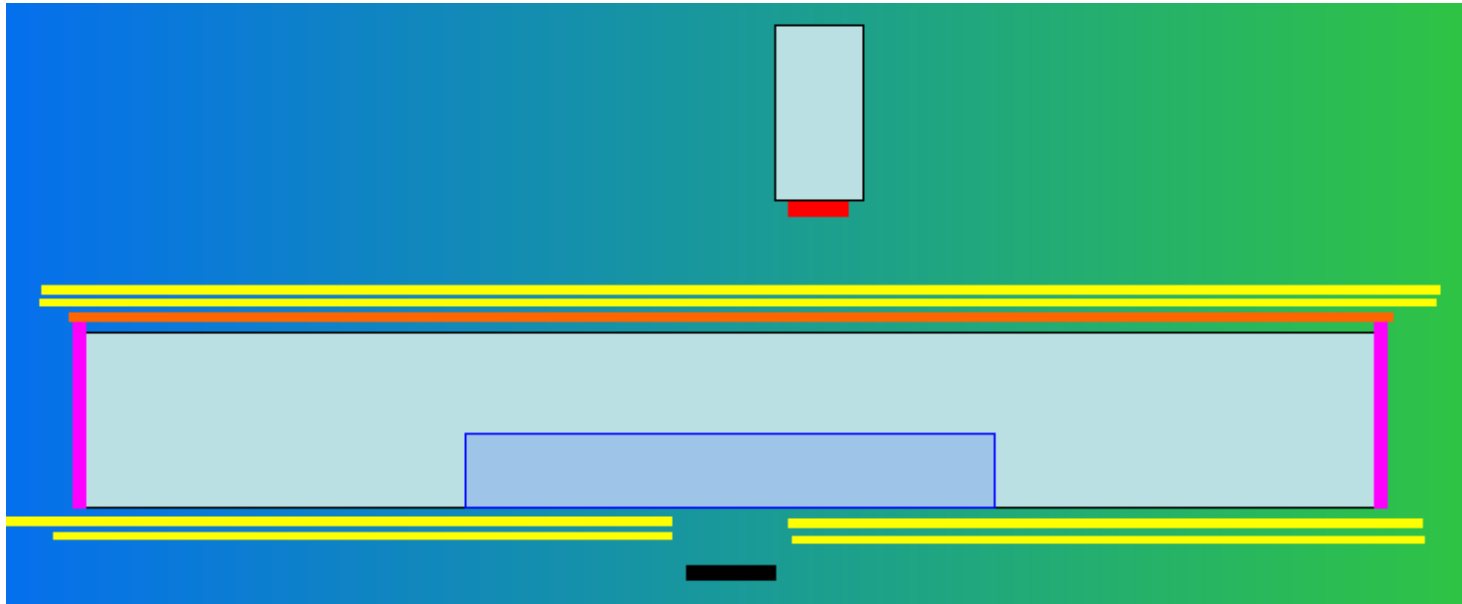


MPPC



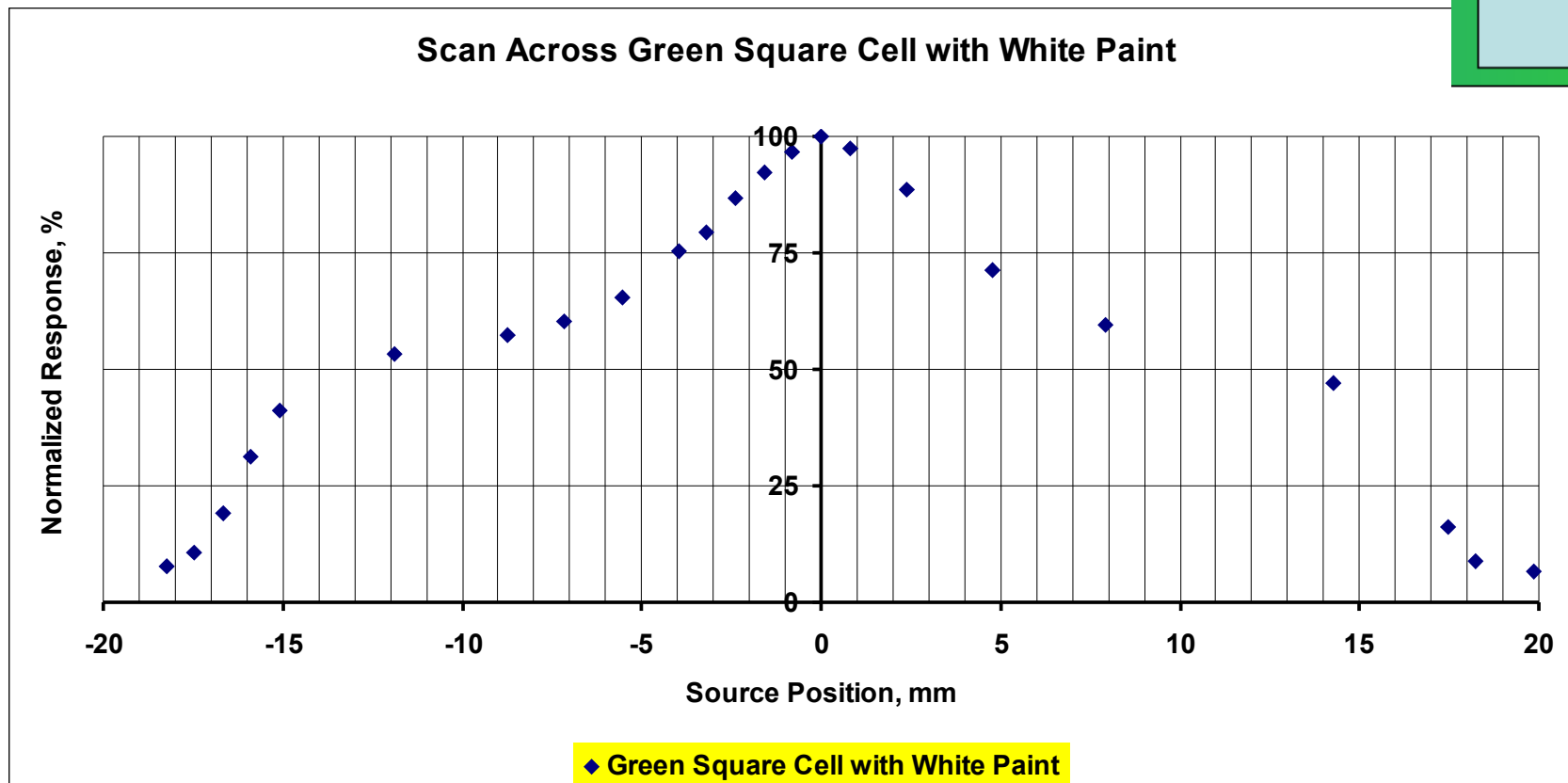
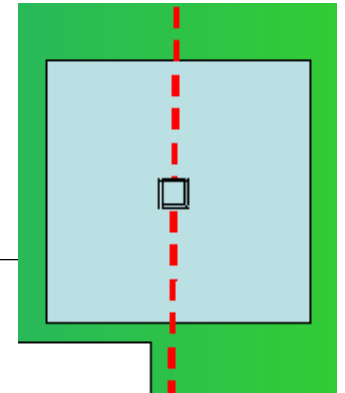
Optical grease contact between sensor and scintillator

Source scan schematic



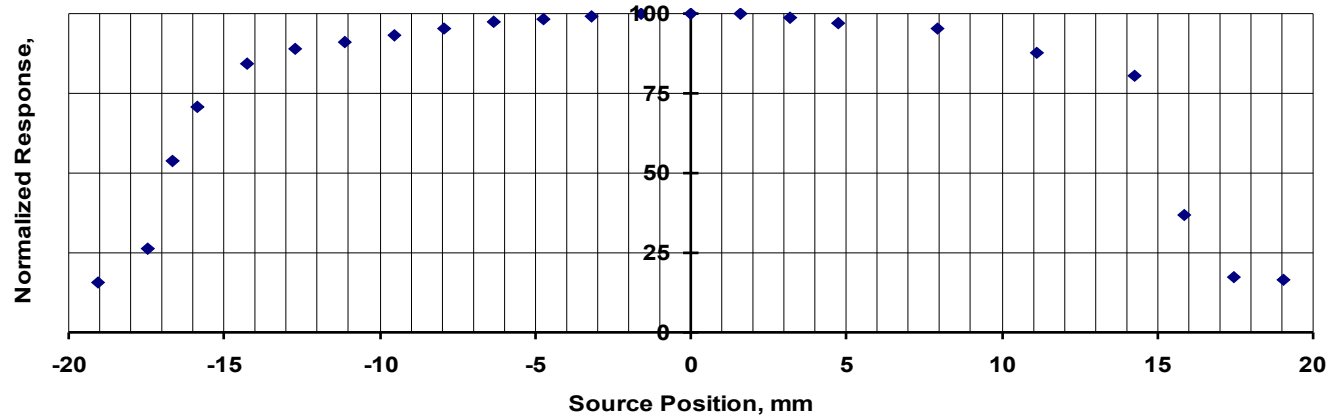
All source scan measurements done with Hamamatsu-025C
Output of photosensor read by picoammeter

Response uniformity

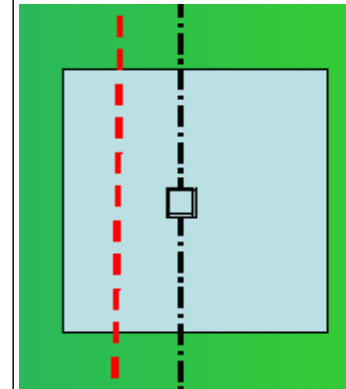


Response uniformity

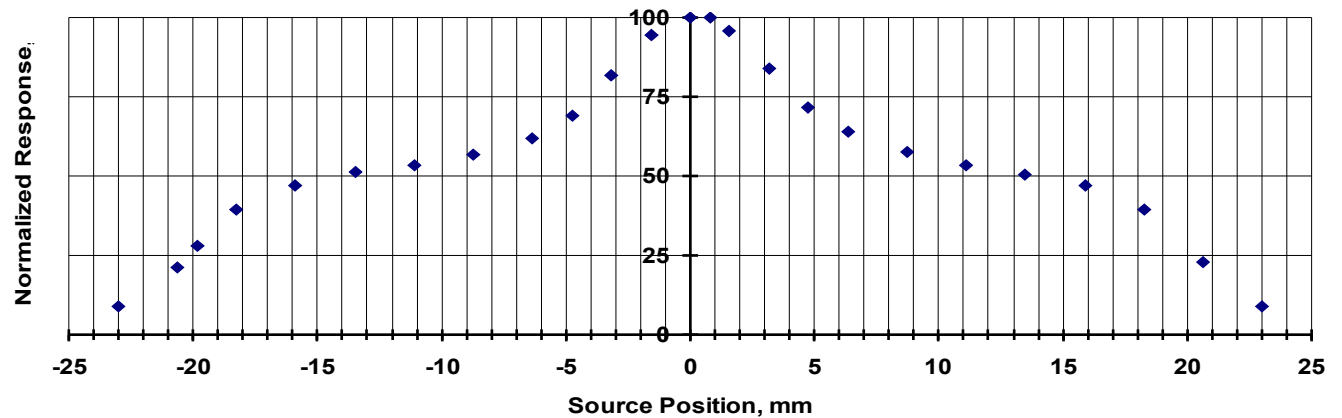
Scan Across Green Square Cell 10 mm off Center



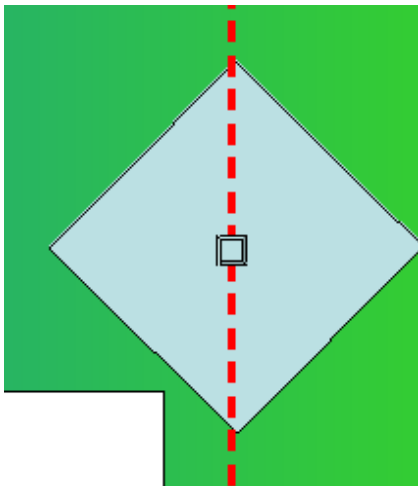
◆ Scan Across 10 mm off Center



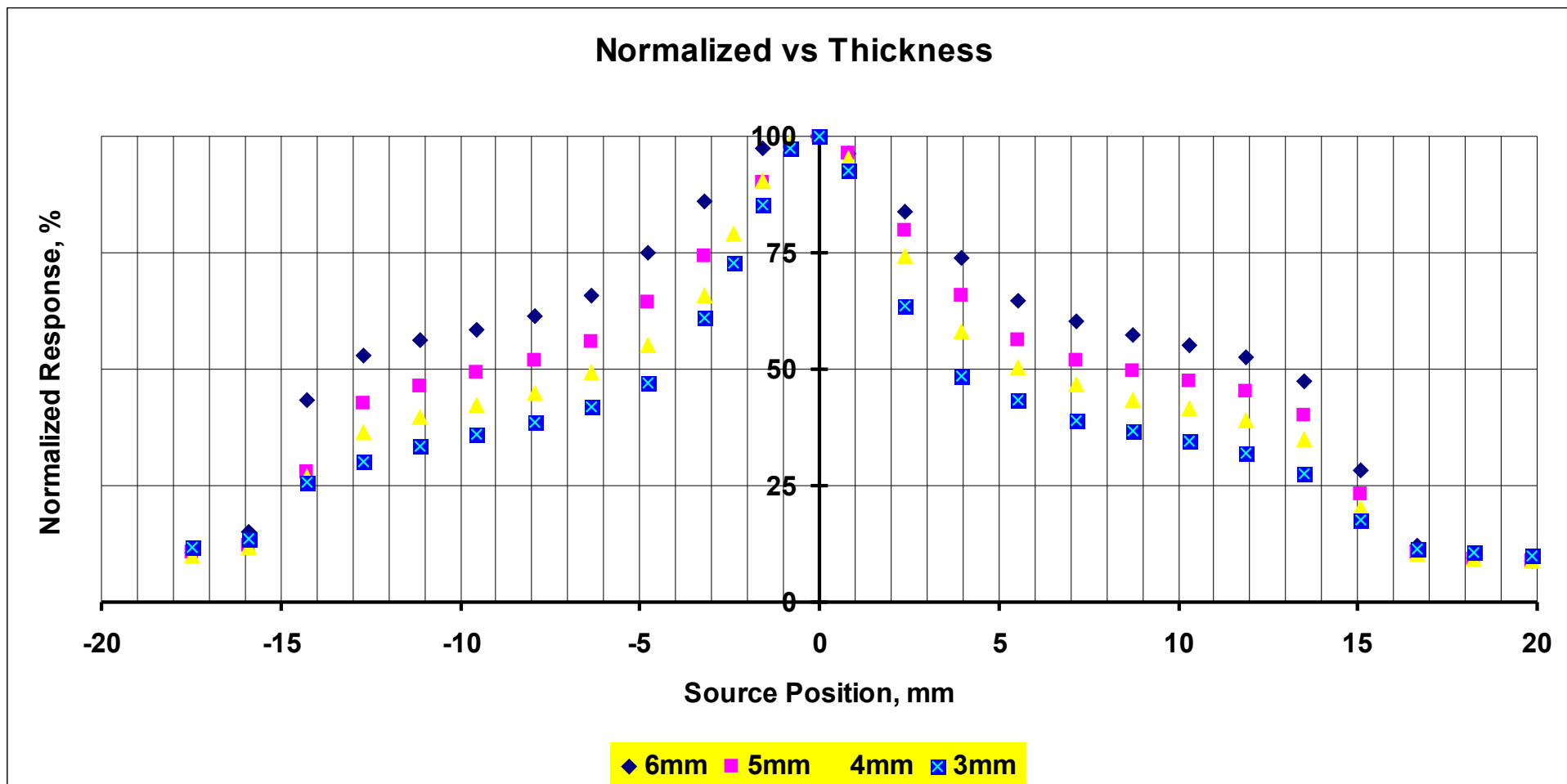
Diagonal Scann of Green Square Cell 31 mm x 32 mm x 6.3 mm



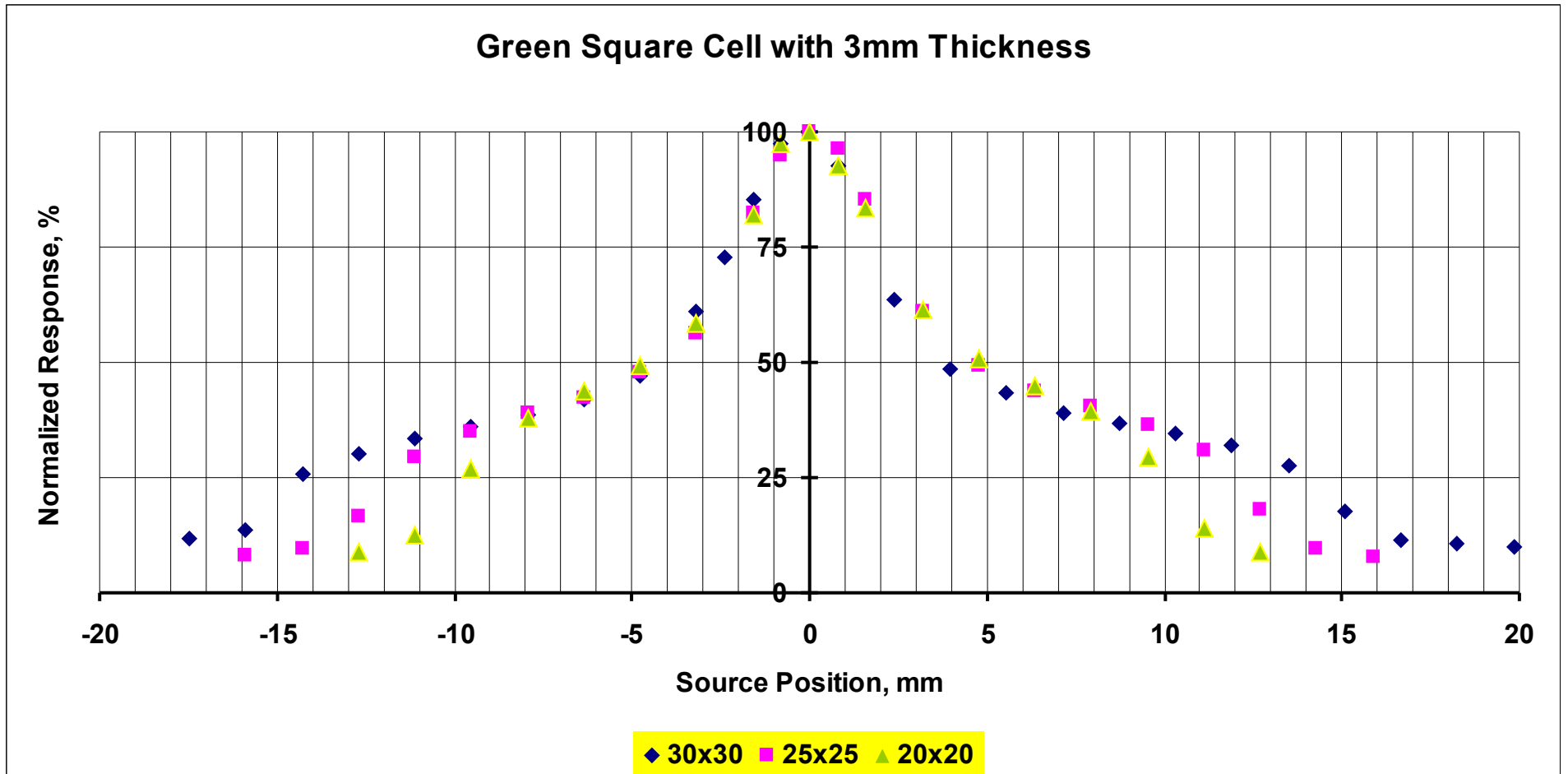
◆ Green Square Cell 31 mm x 32 mm x 6.3 mm



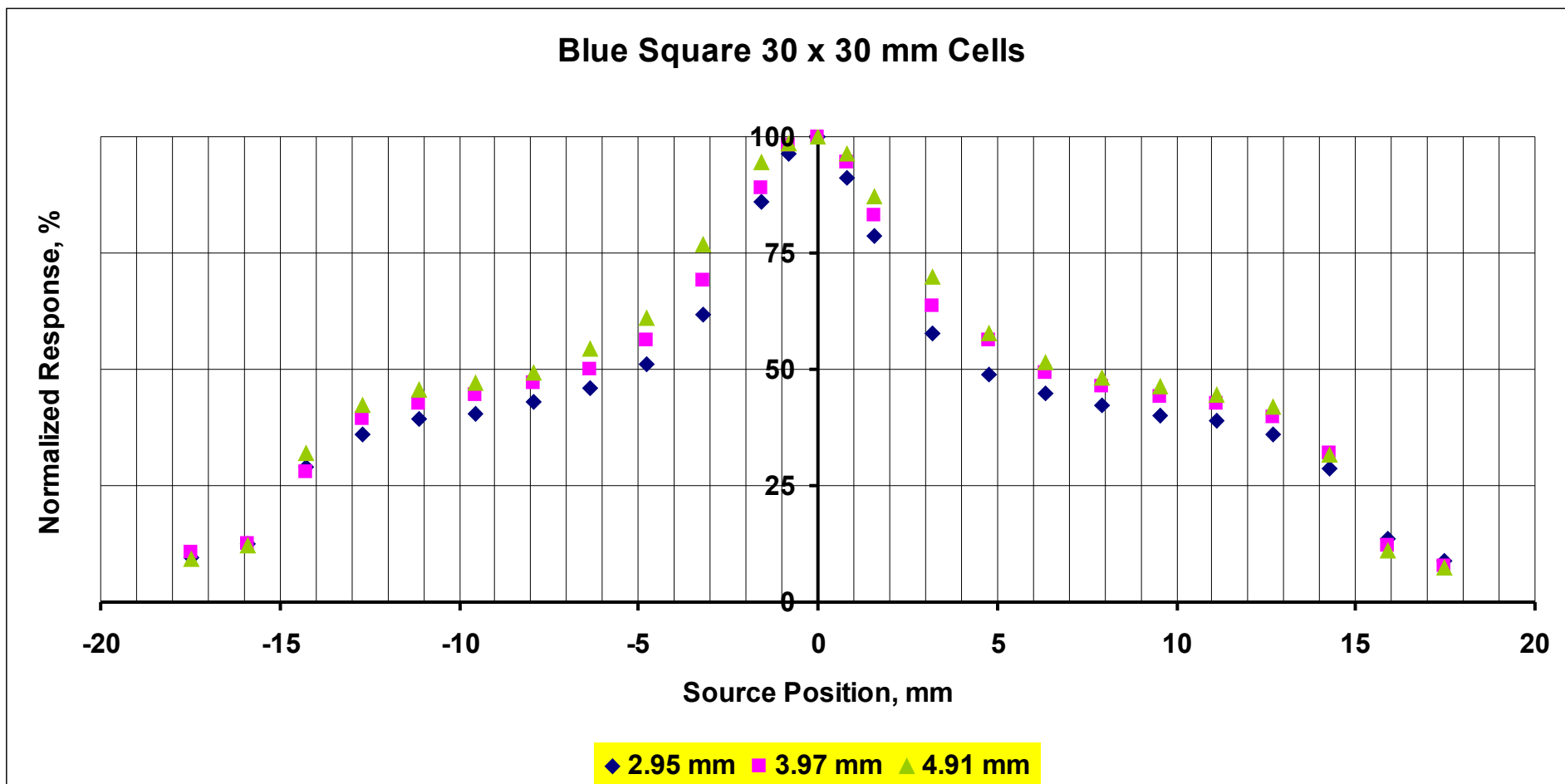
Response Uniformity



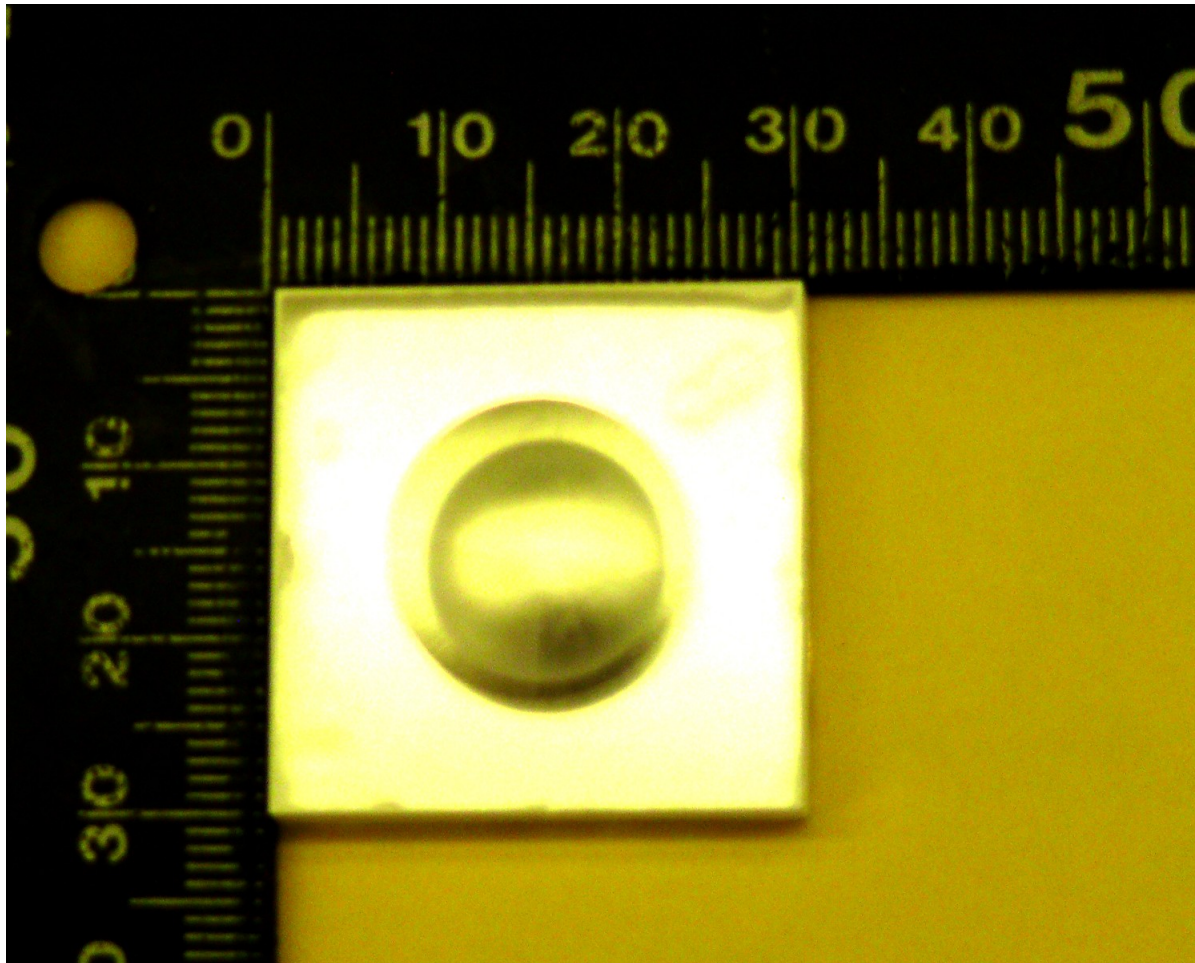
Response uniformity



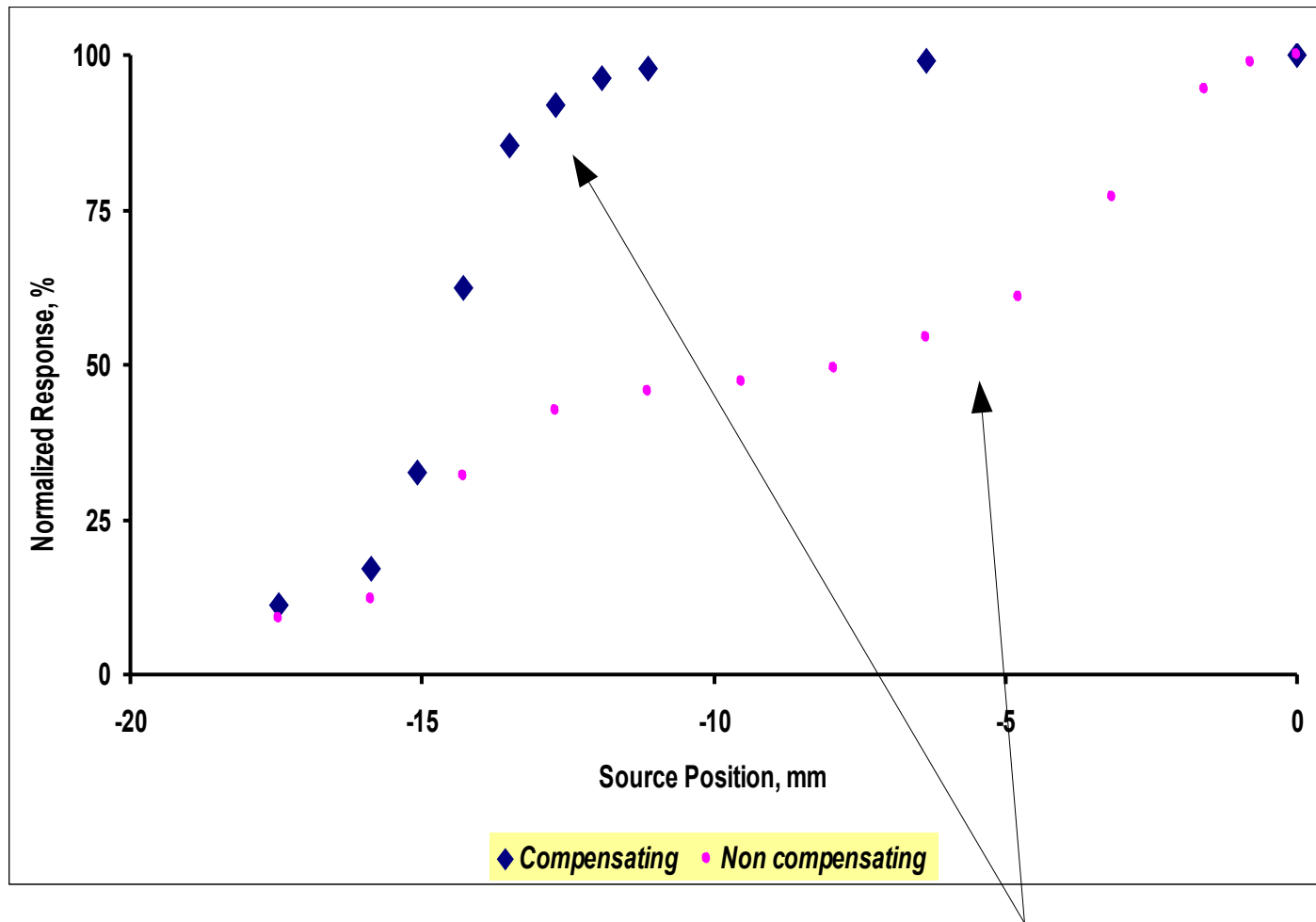
Response Uniformity



Modified Tile

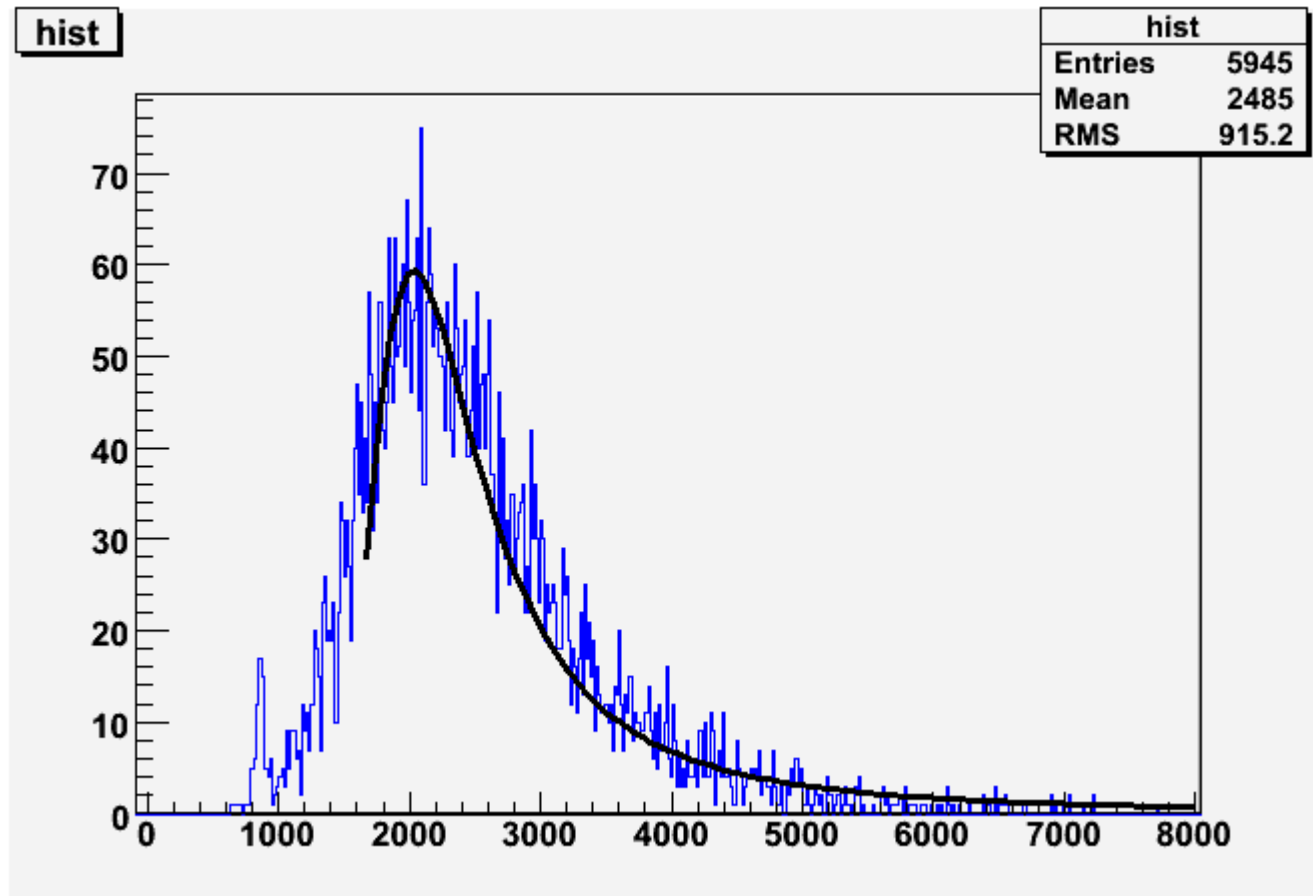


Source Scan Uniformity



Independently normalized

Cosmics (modified tile)



MPPC directly coupled to blue scintillator

Summary

- Direct coupling deserves further study
- Preliminary studies are encouraging and indicate that requisite response and uniformity may be achievable

Hamamatsu MPPCs

