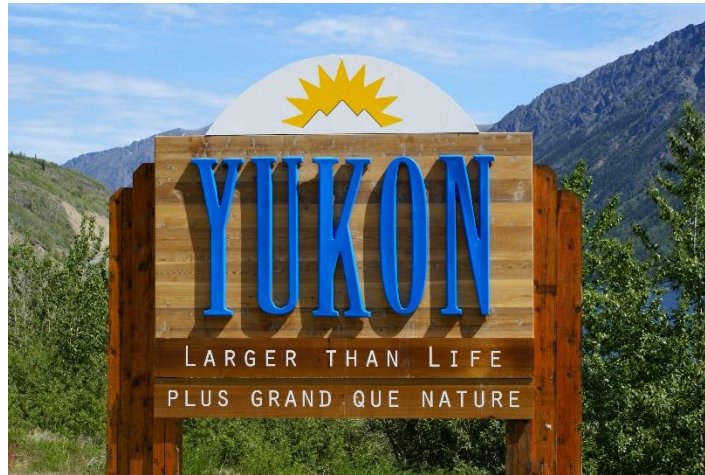
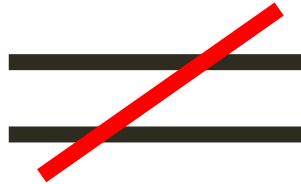


DIAMOND RADIATOR DEVELOPMENT FOR THE GLUOX EXPERIMENT

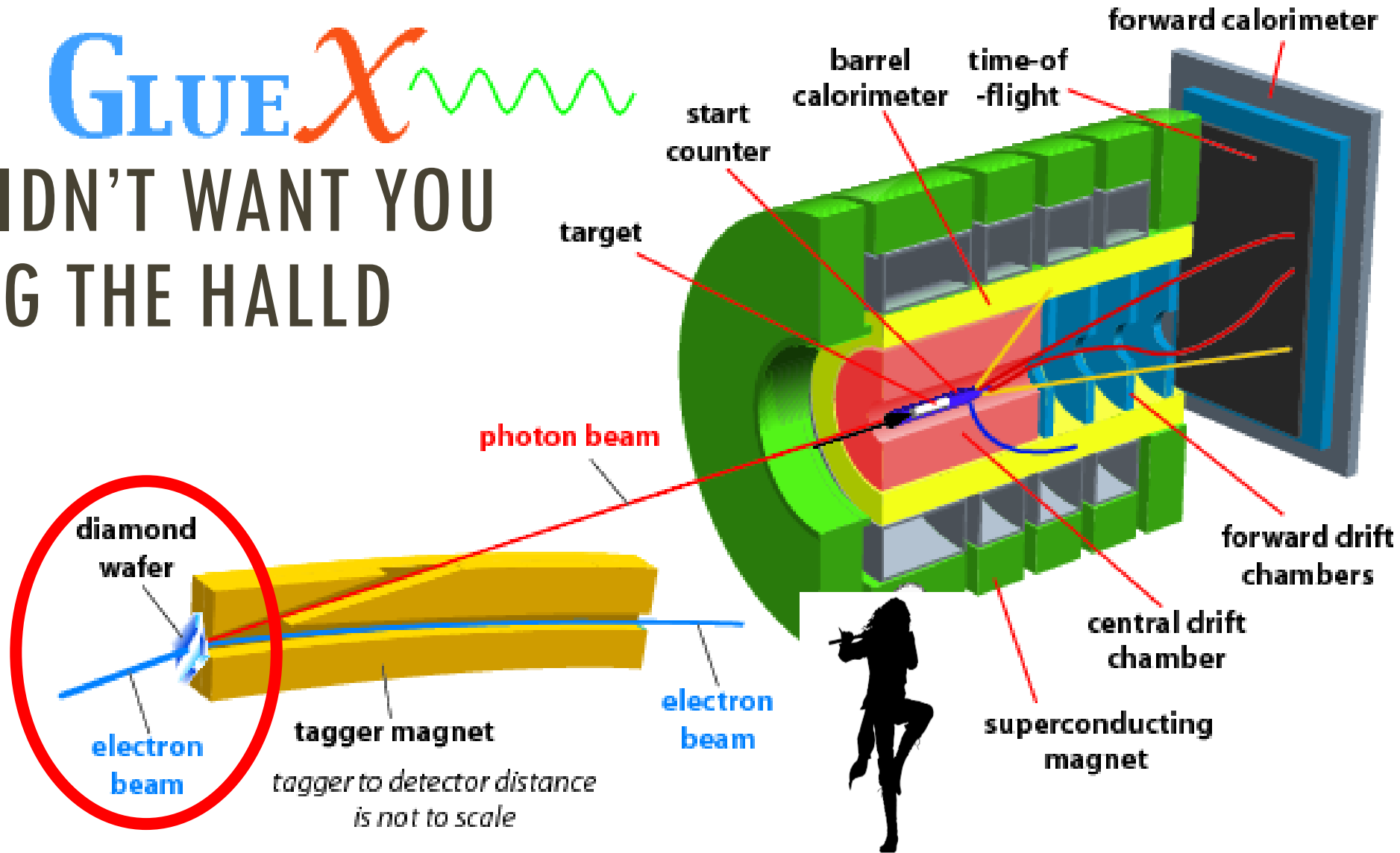
Brendan Pratt
University of Connecticut
HUGS 2015

GREETINGS FROM CONNECTICUT!



GLUE

WHAT THEY DIDN'T WANT YOU TO SEE DURING THE HALLD TOUR



HEY ^{COHERENT} BREMSSTRAHLUNG!

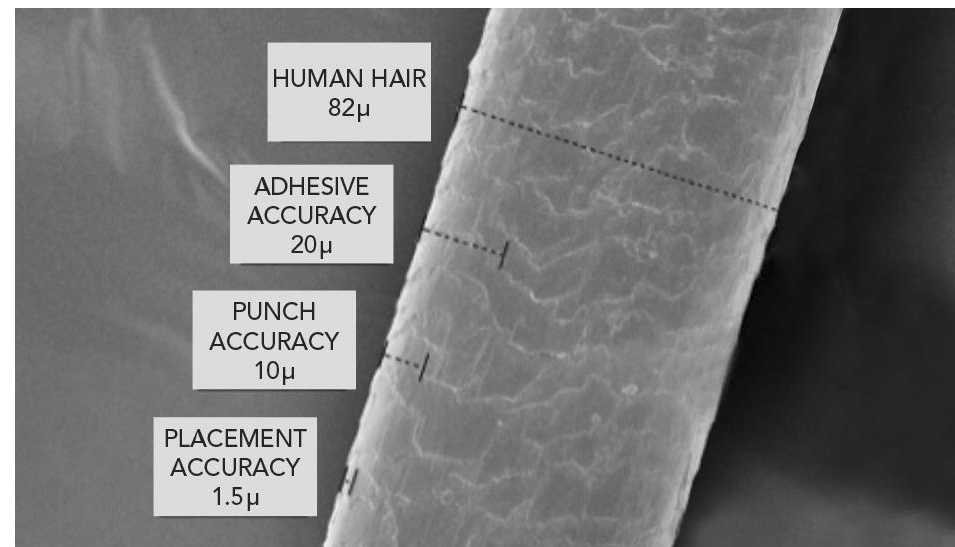
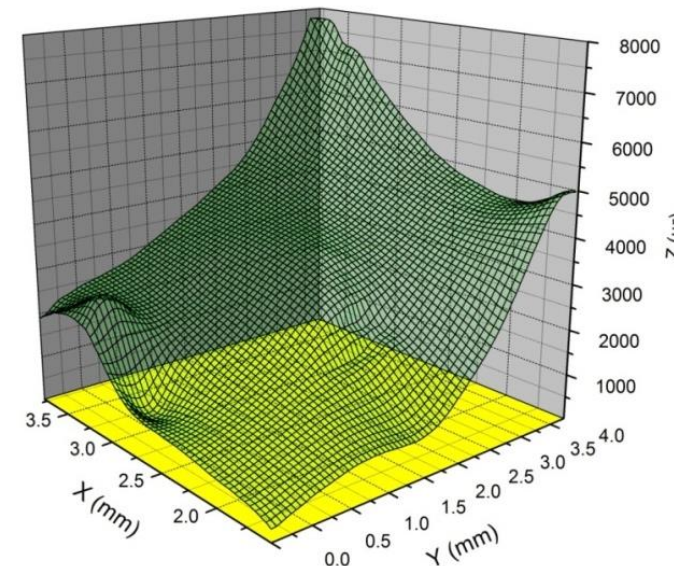
WHY THIN AND FLAT DIAMONDS?

Must also have well defined crystal structure with whole crystal rocking curves less than 30μ r

Low thermal expansion at high temperatures (large beam currents)

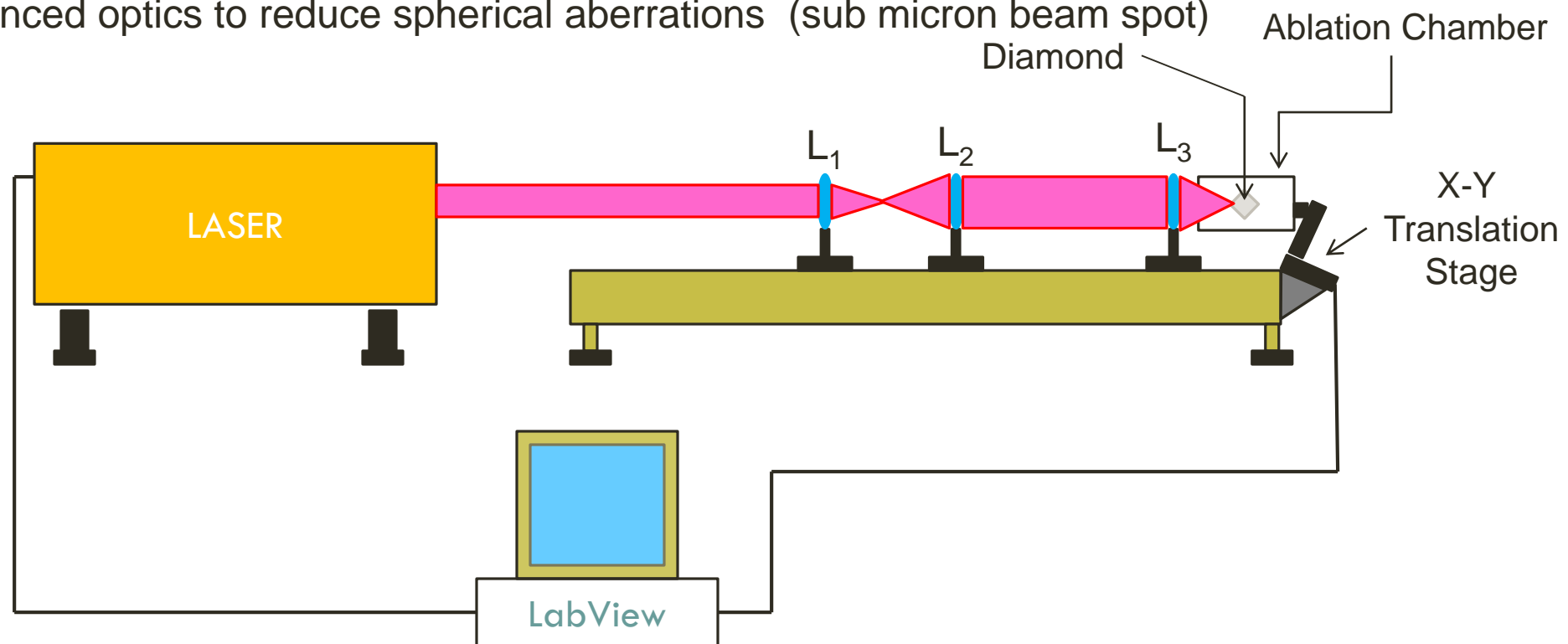
Radiators restricted to 20μ m thickness due to multiple scattering

Techniques for thinning diamond exist, but they leave samples stressed and “potato chipped”



UCONN LASER ABLATION FACILITY

- CNC style XYZ translation and laser pulsing via LabView
- Ablation Chamber optimized to reduce amorphous carbon deposition on windows
- Enhanced optics to reduce spherical aberrations (sub micron beam spot)

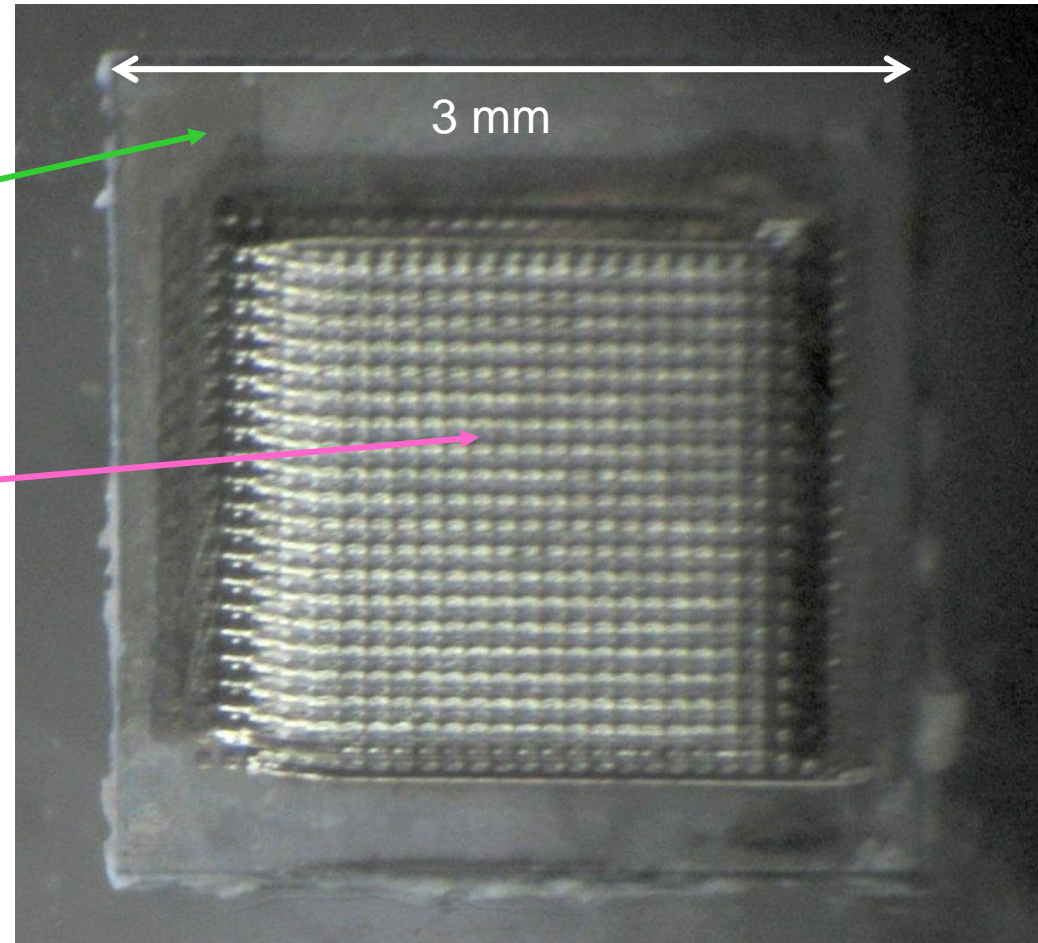


FIRST "PICTURE FRAME" SAMPLE: U40

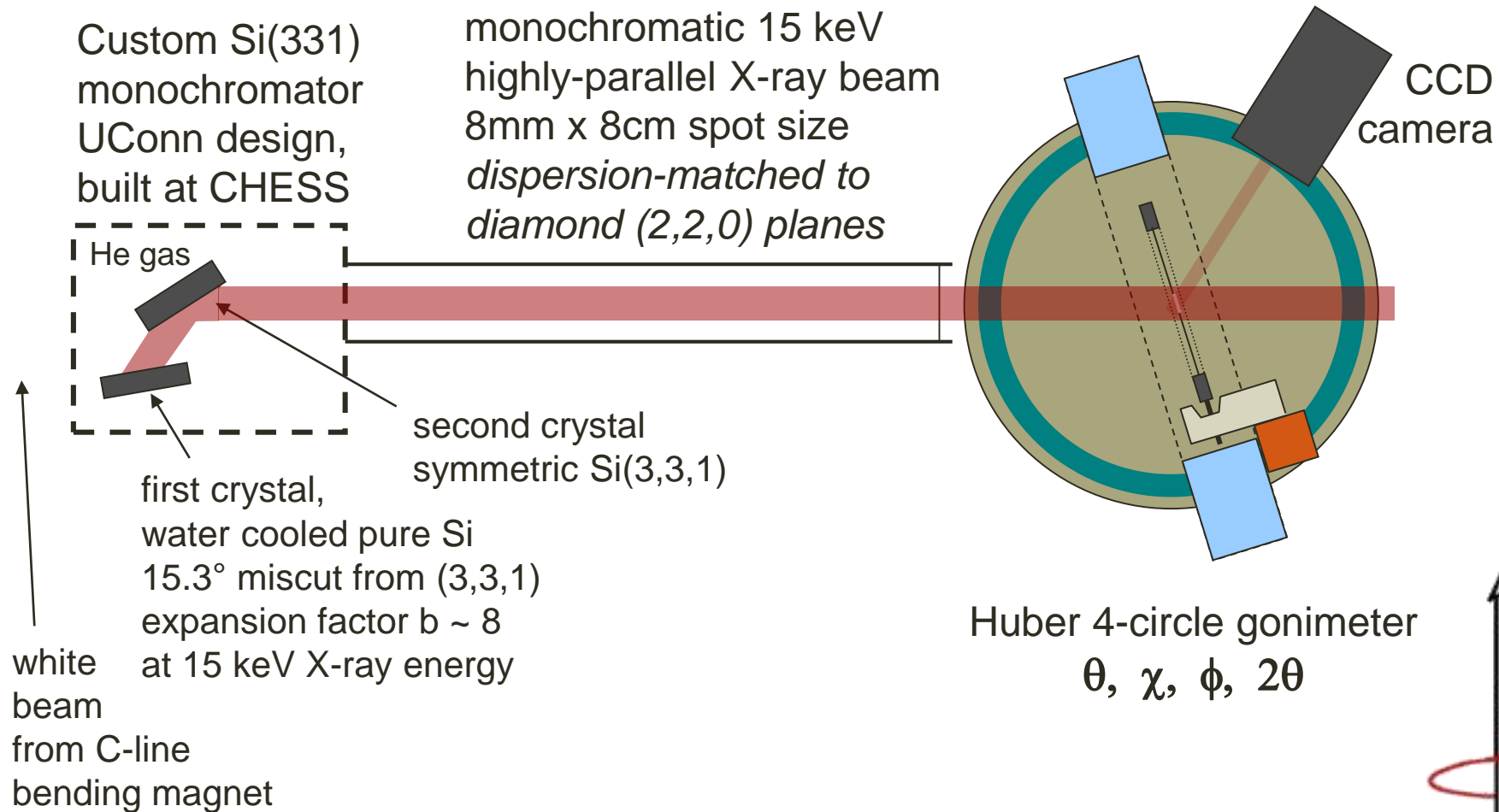
315 micron
frame around
outside edge

thinned inner
rectangular
window

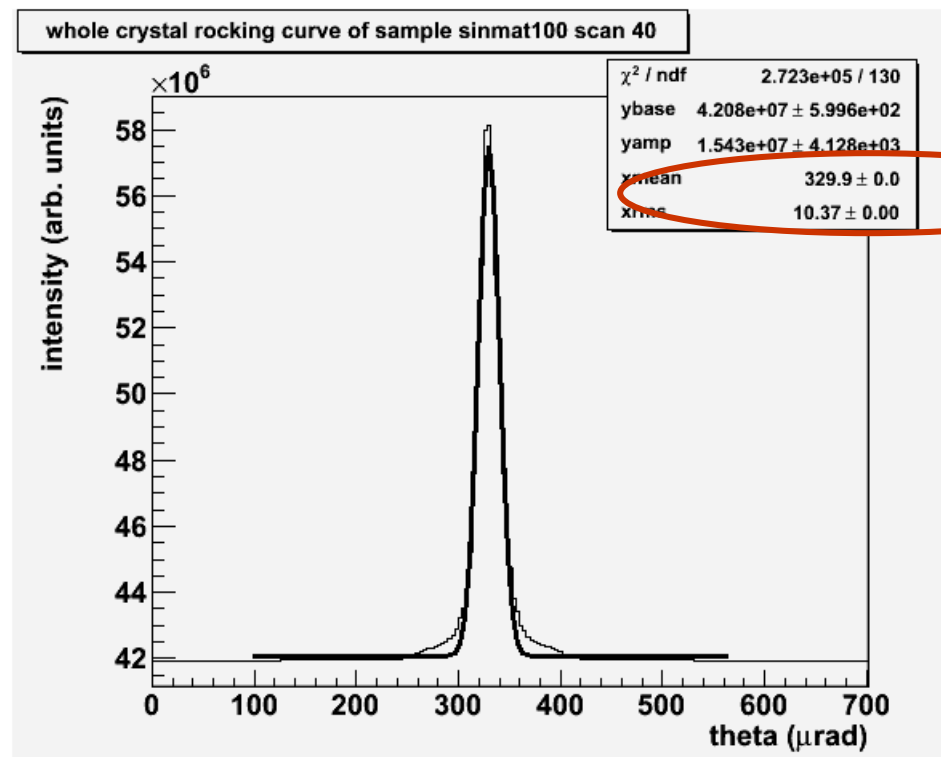
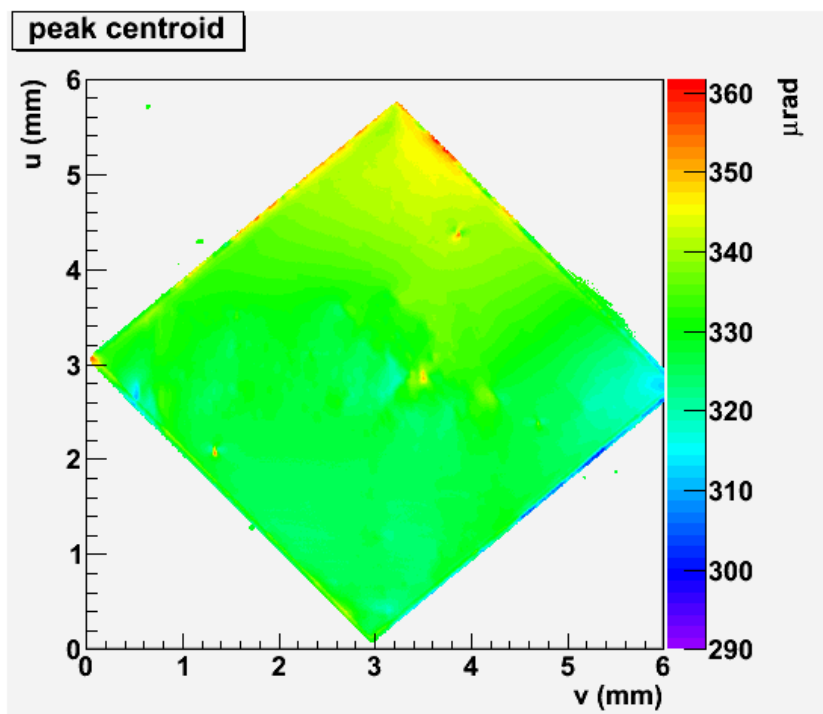
residual raster
pattern is from
a coarse laser
step size



SETUP FOR DIAMOND DIFFRACTION AT CHESS

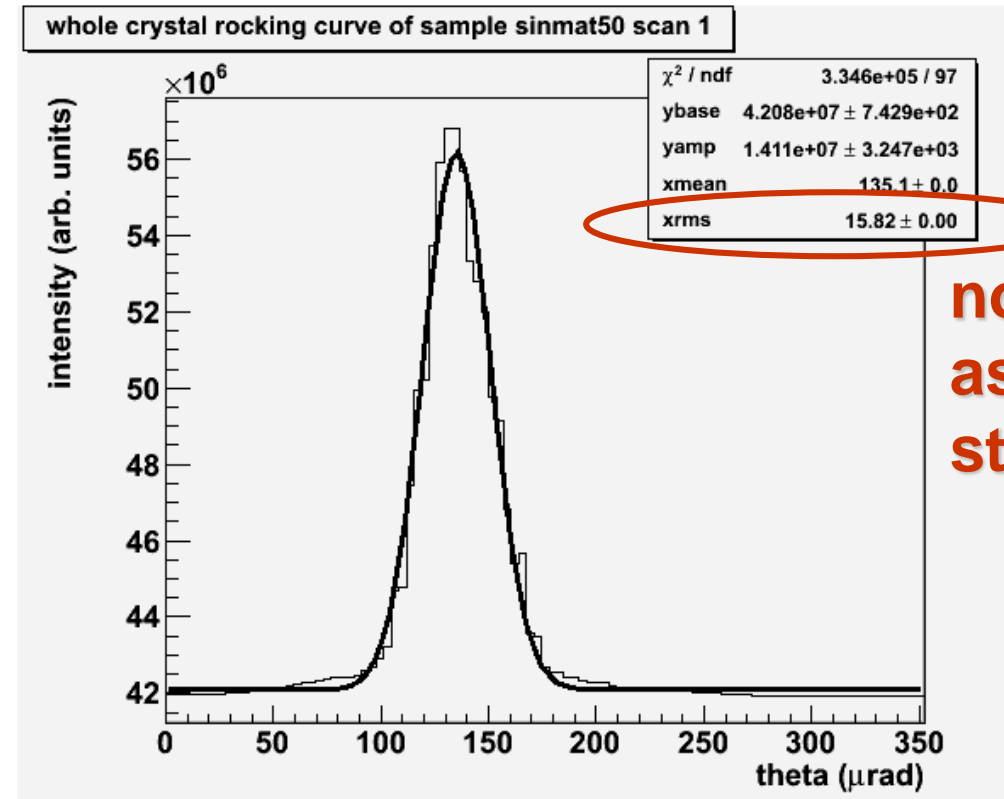
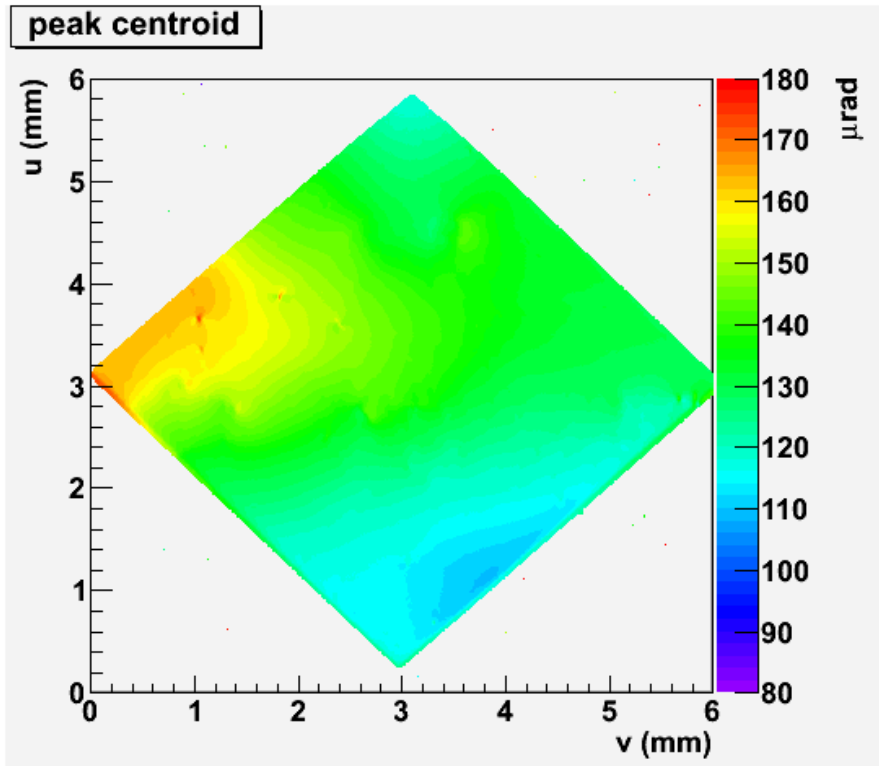


X-RAY ASSESSMENT: S150



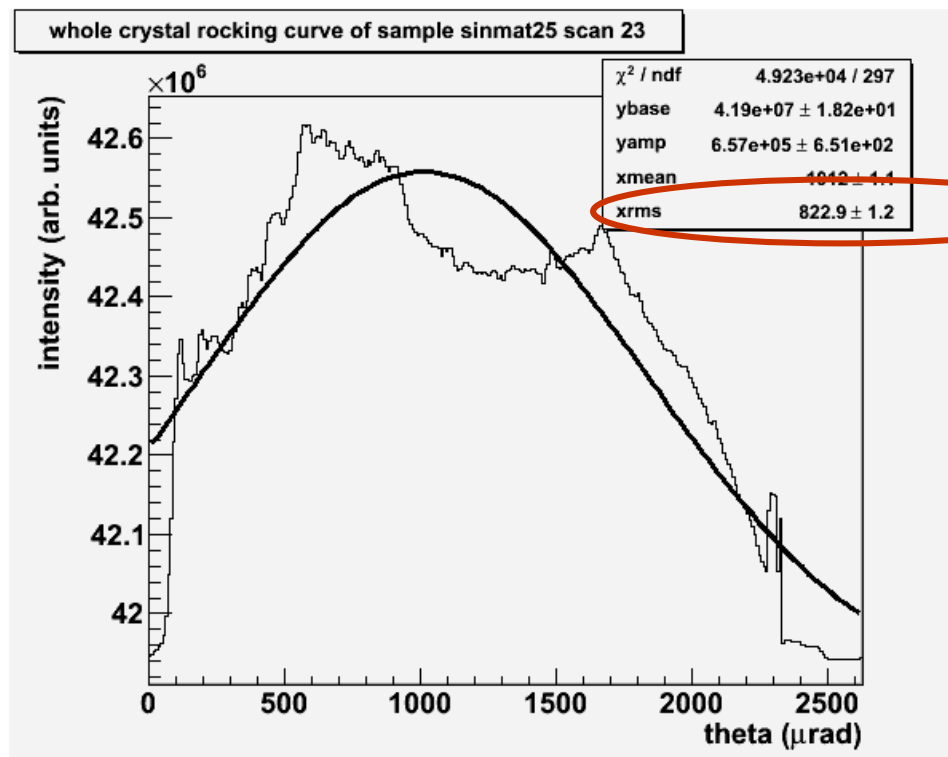
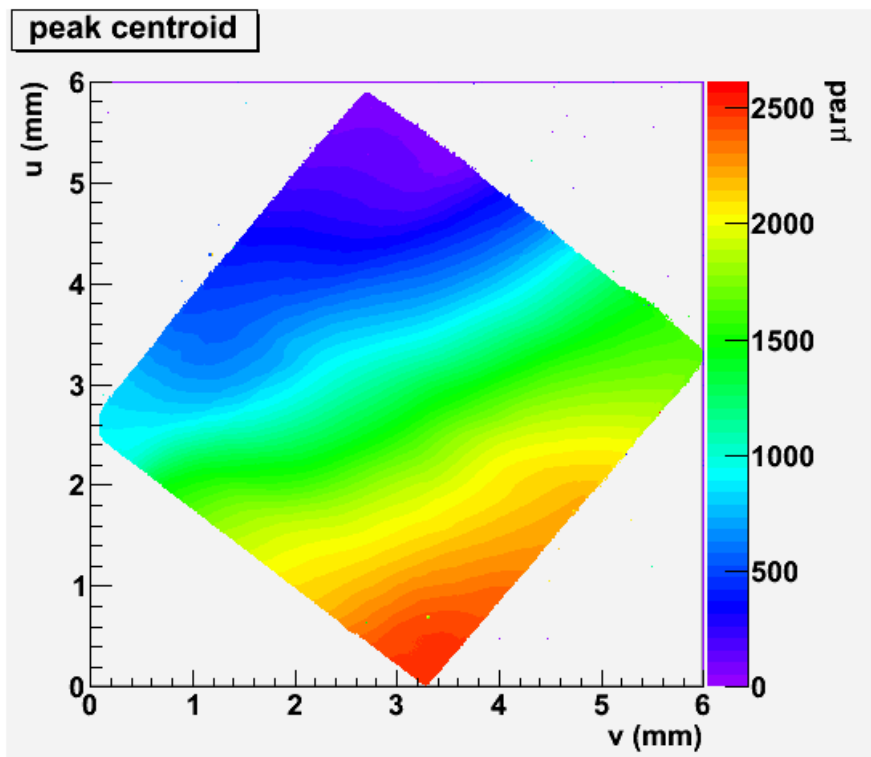
limited by
instrumental
resolution !

X-RAY ASSESSMENT: S90



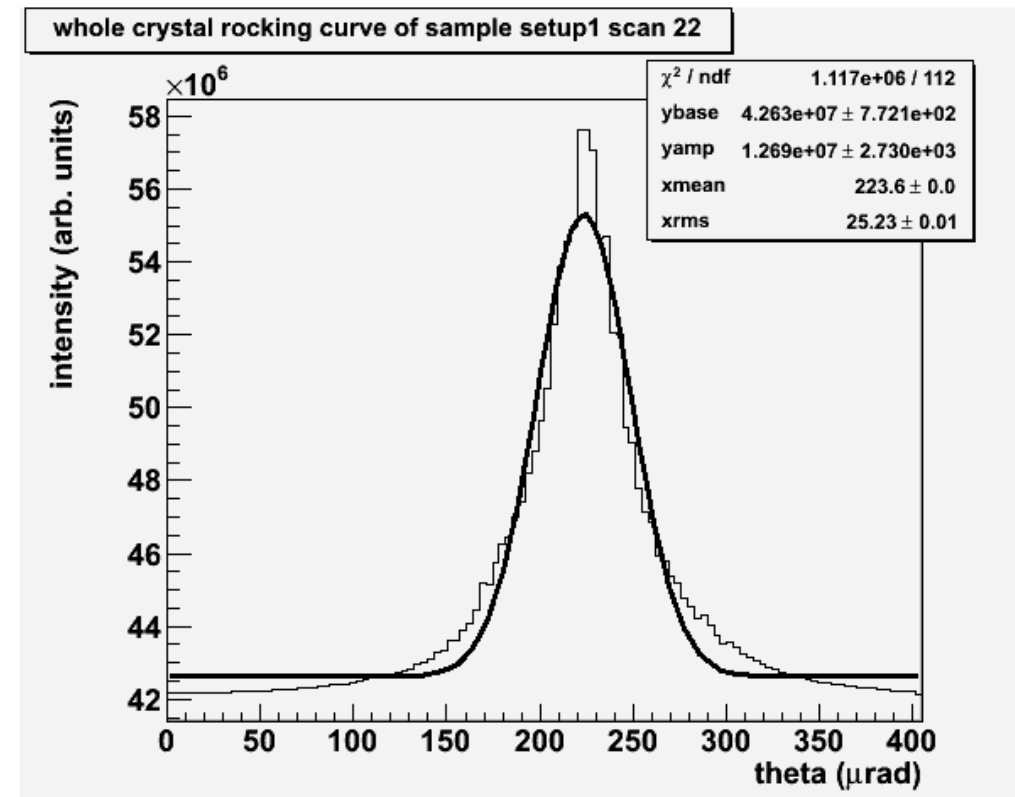
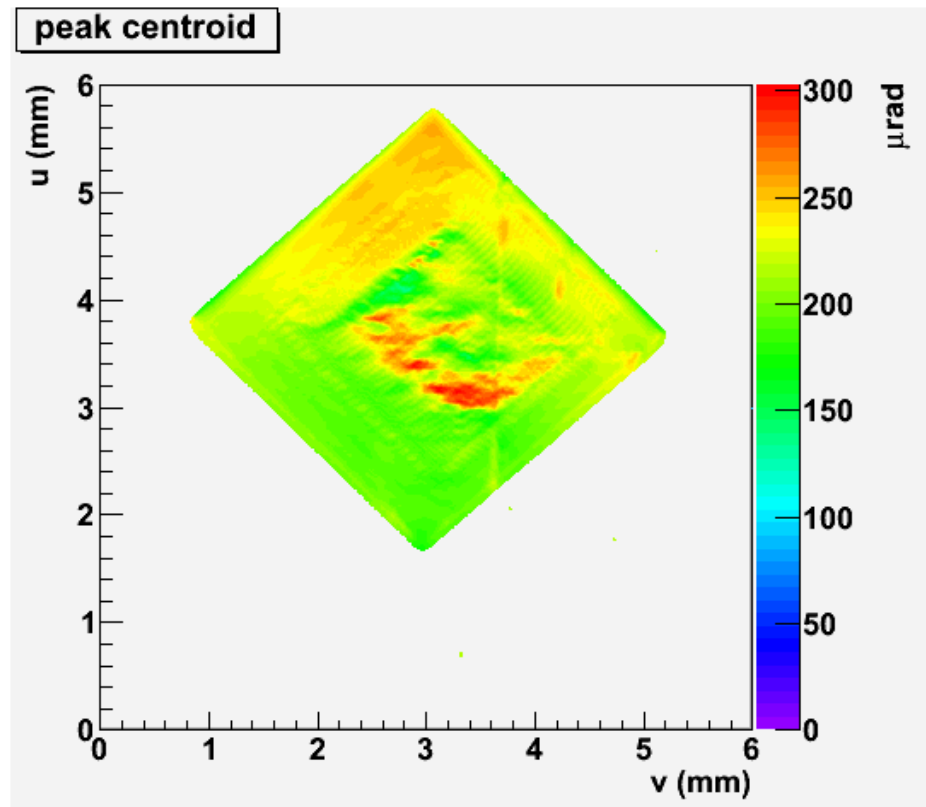
not as flat
as S150, but
still in spec.

X-RAY ASSESSMENT: S30 – THE *REAL* TARGET

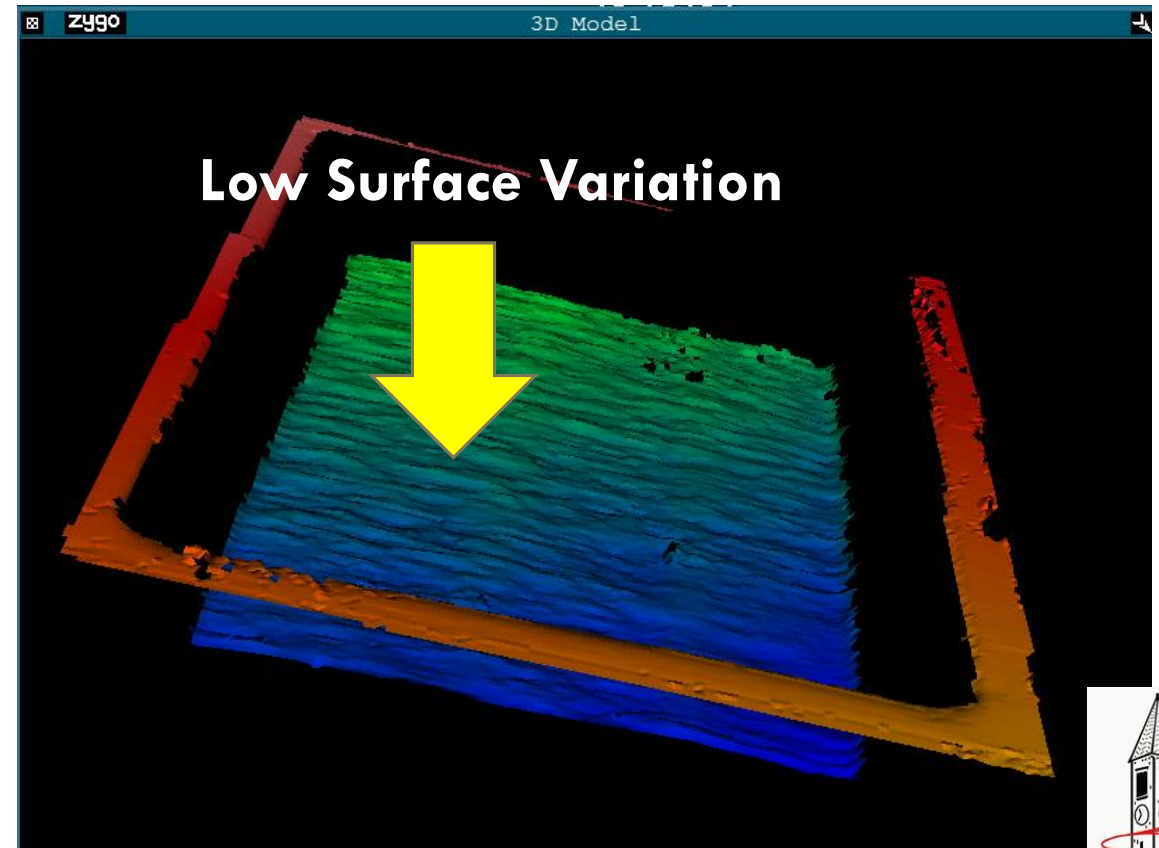
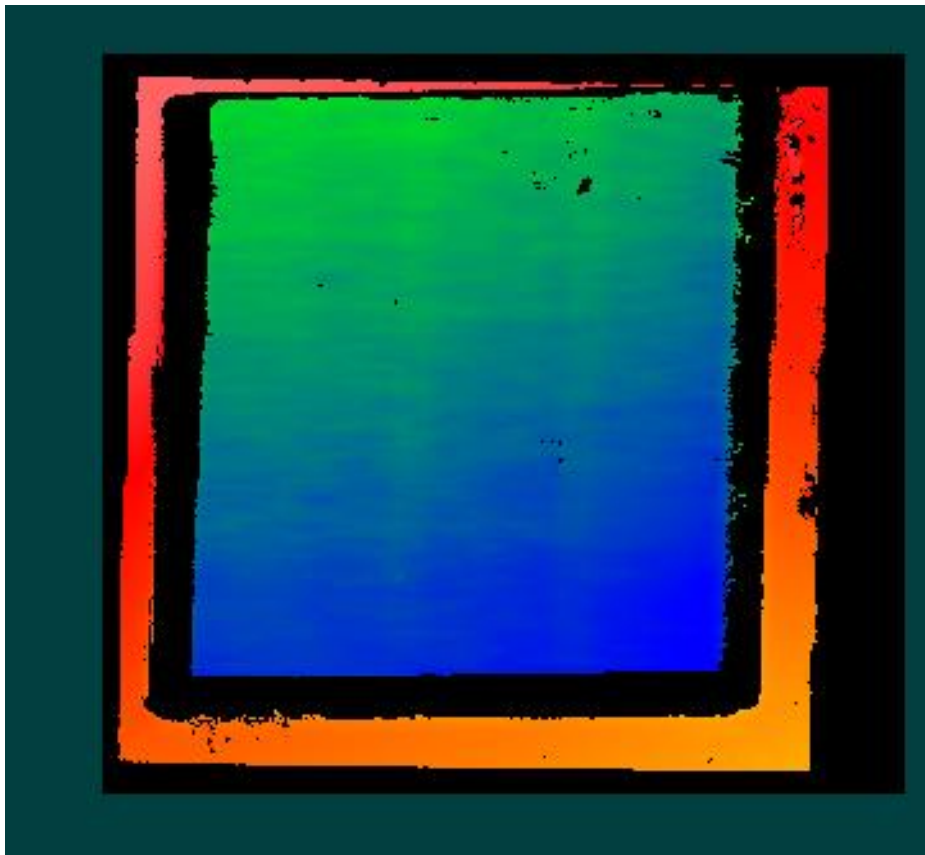


**challenge
lies here!**

X-RAY ASSESSMENT: UC40 FIRST DIAMOND TO REACH SPEC (SORT OF)

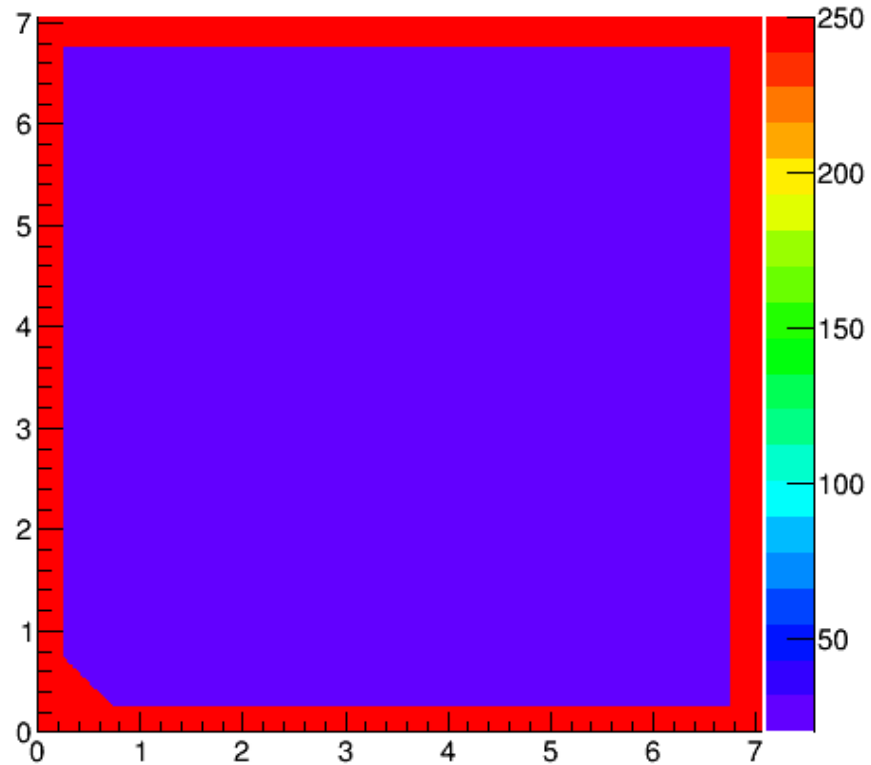


IMPROVEMENTS: LASER SWEEP

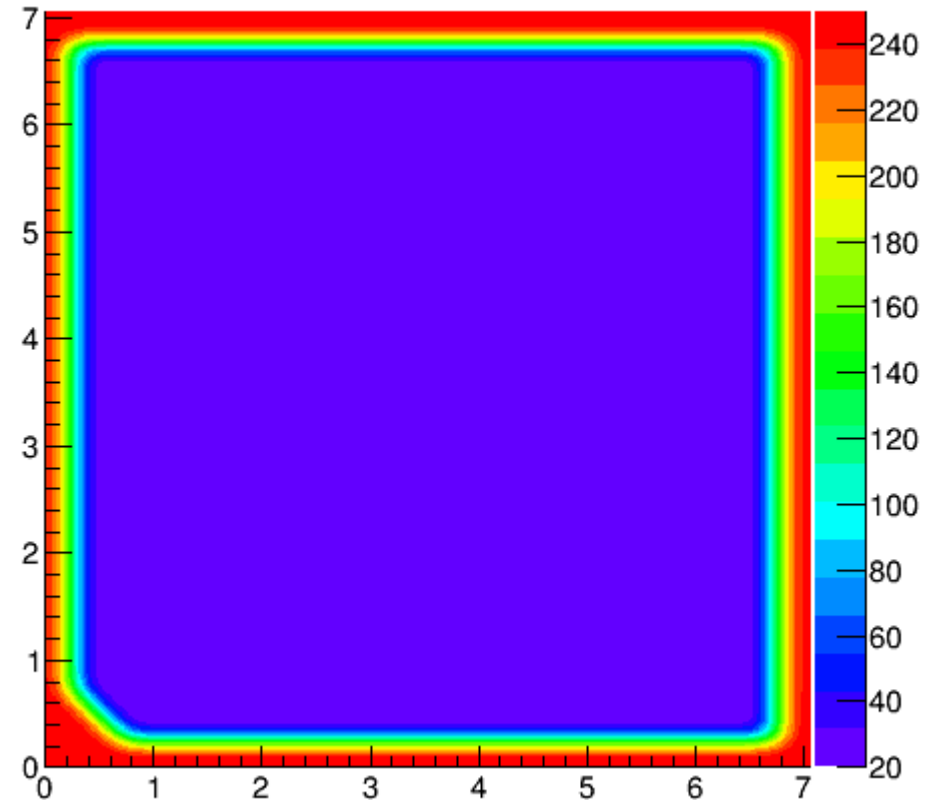


ADDITIONAL CAPABILITIES

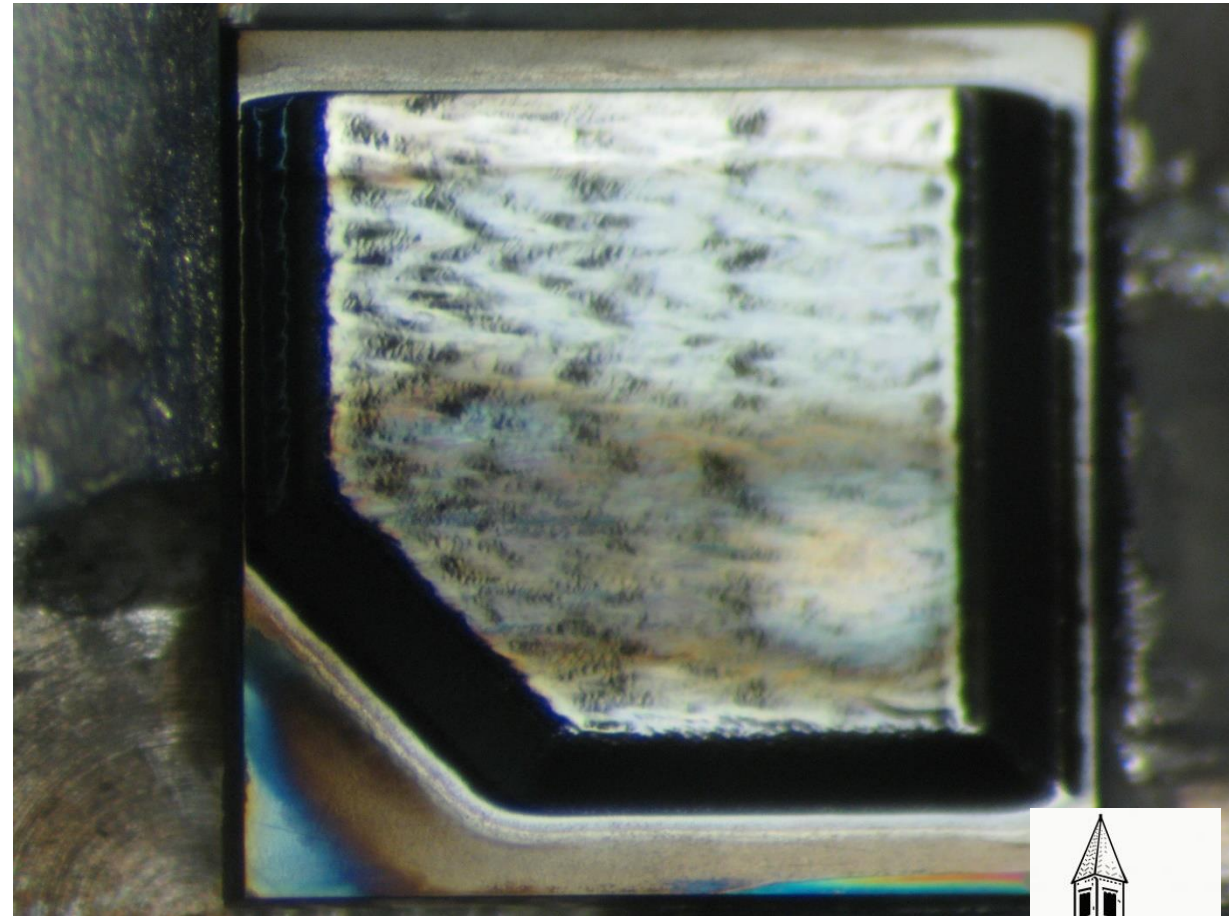
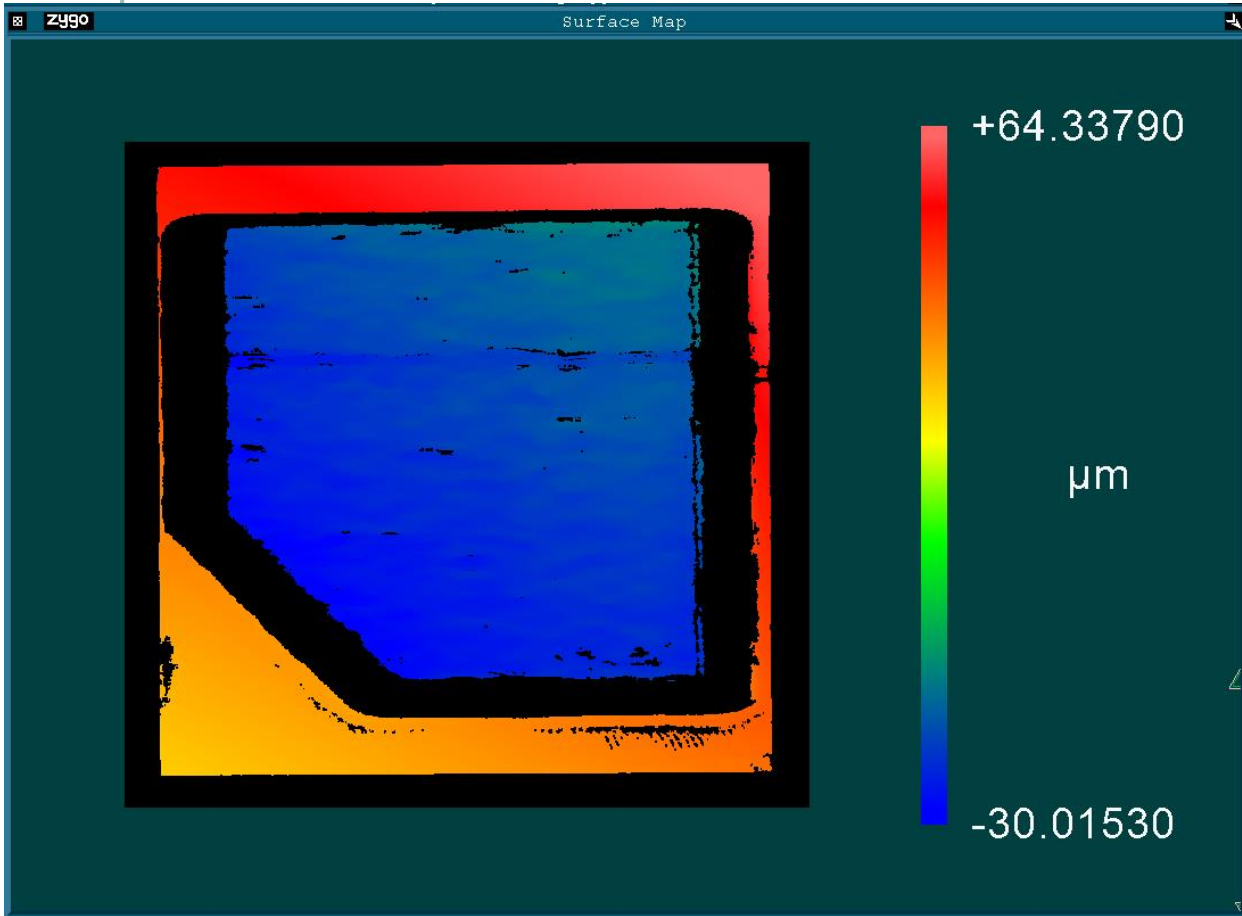
target surface



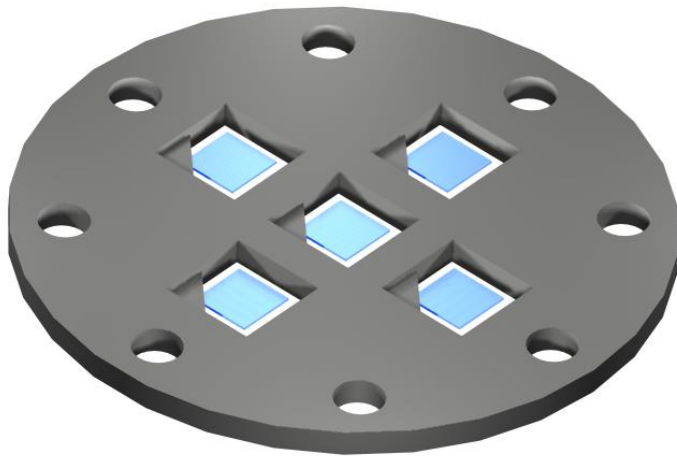
target surface



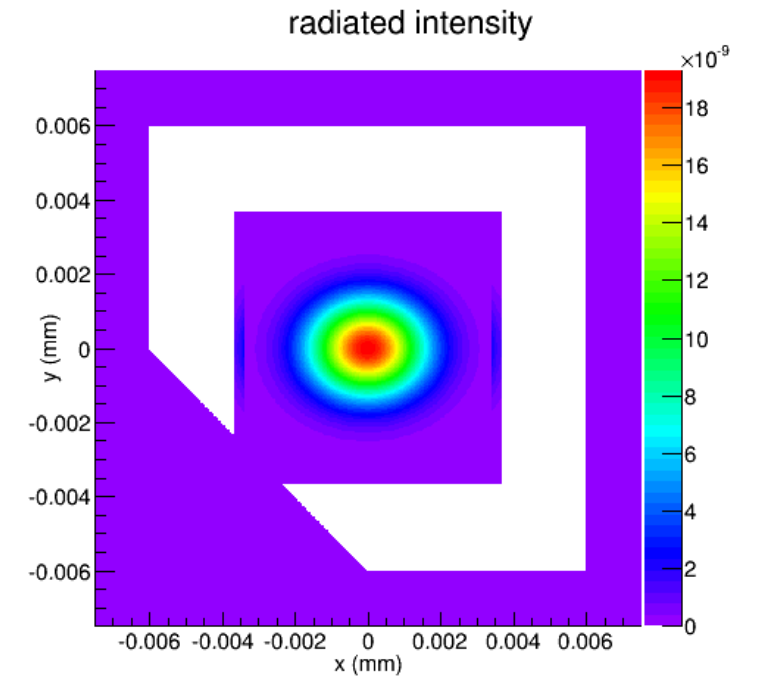
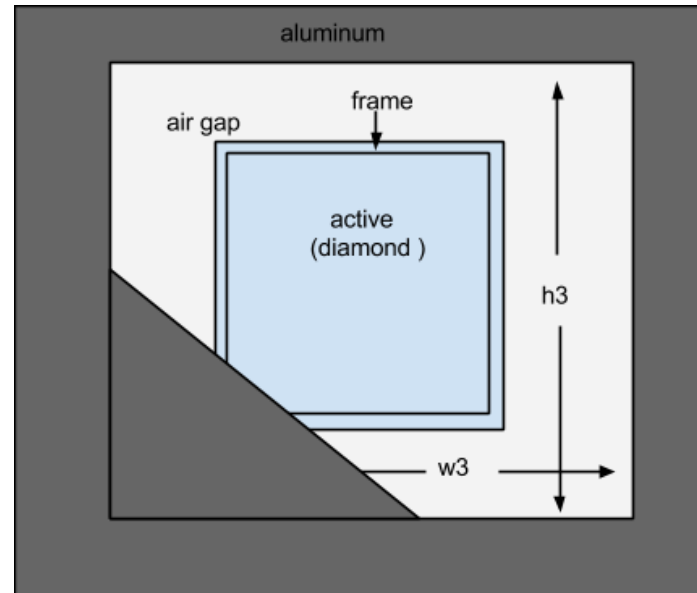
UC30-14-C225

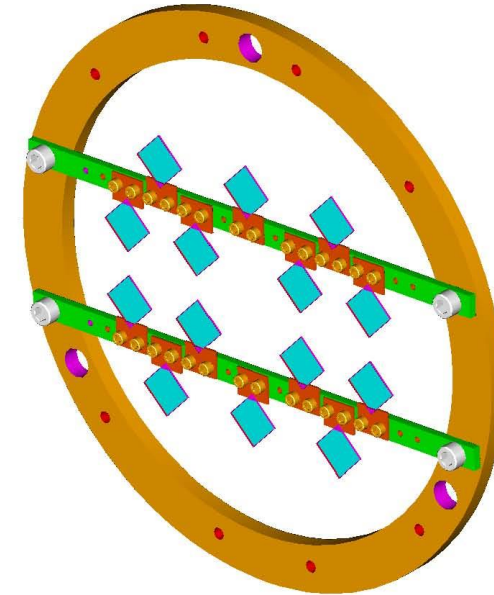
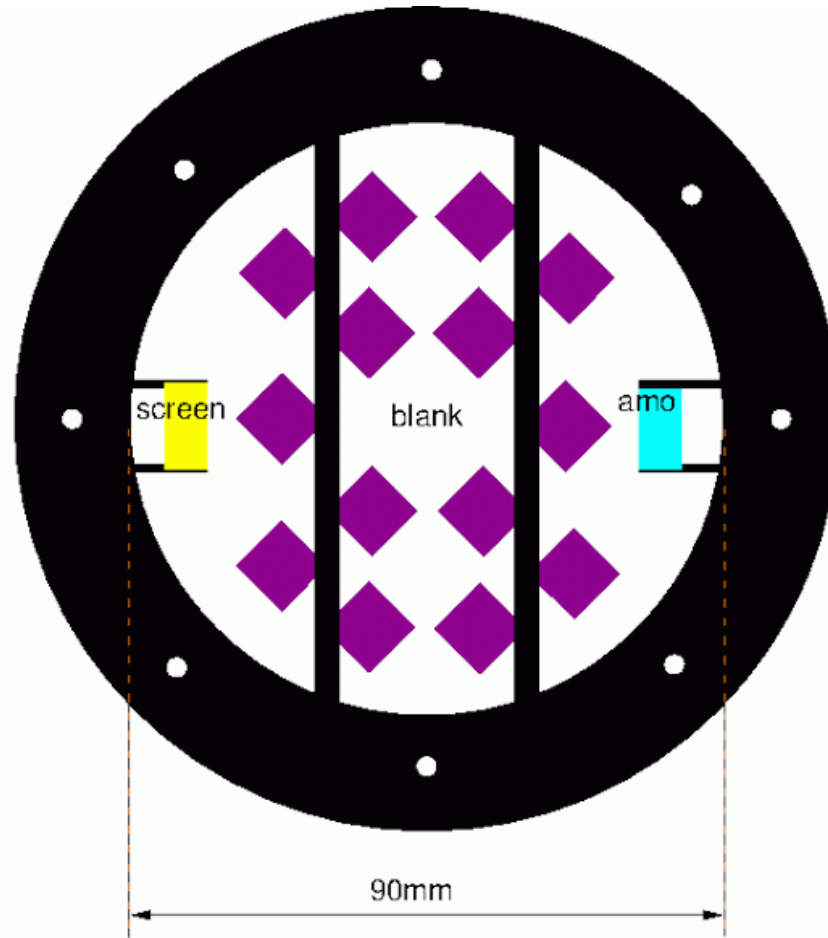
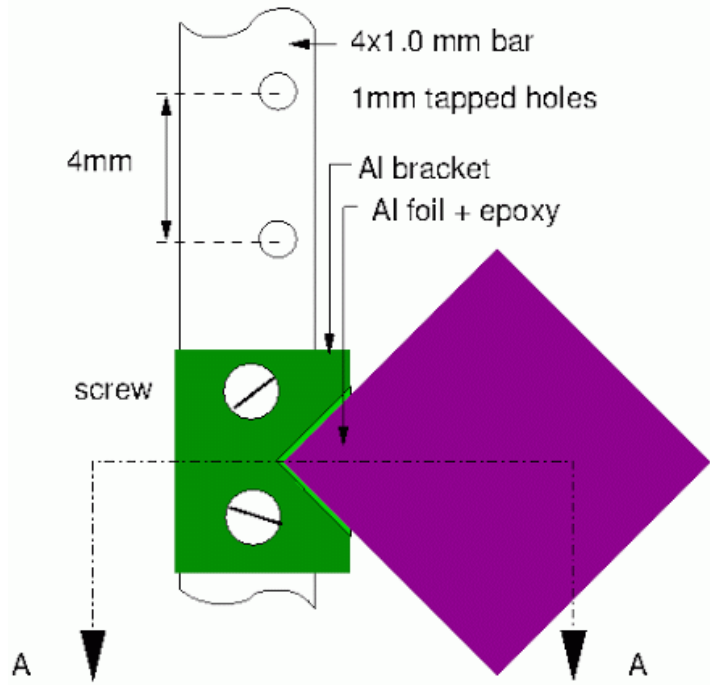


SIMULATION OF BACKGROUND GENERATION

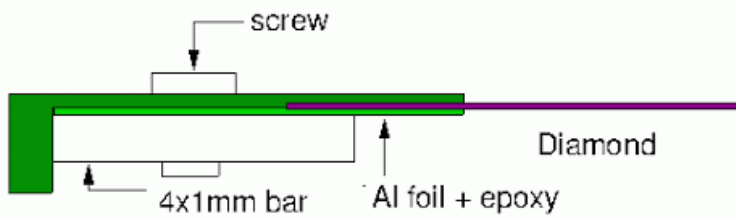


initial design concept





DIAMOND RADIATORS MOUNTING RING ASSY - SCREENSHOT



Enlarged section AA

ACKNOWLEDGEMENTS

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