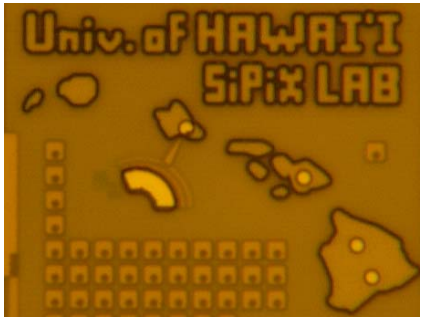
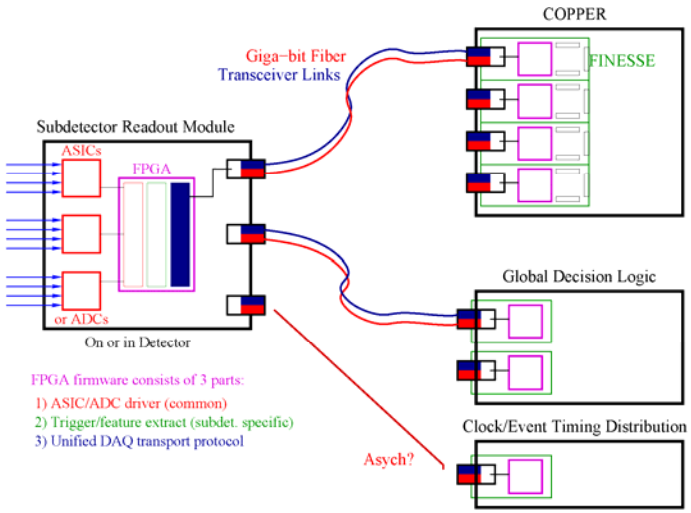
X-ray FEL Detector mechanics



- BaF2 specs
- Draft core/mechanical enclosure
  - Width and depth
  - Proposed conduit box



Juaquin Anderson
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Gary Varner

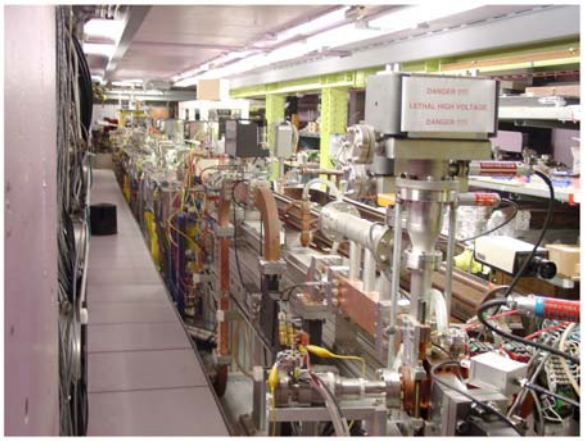
9-FEB-2010

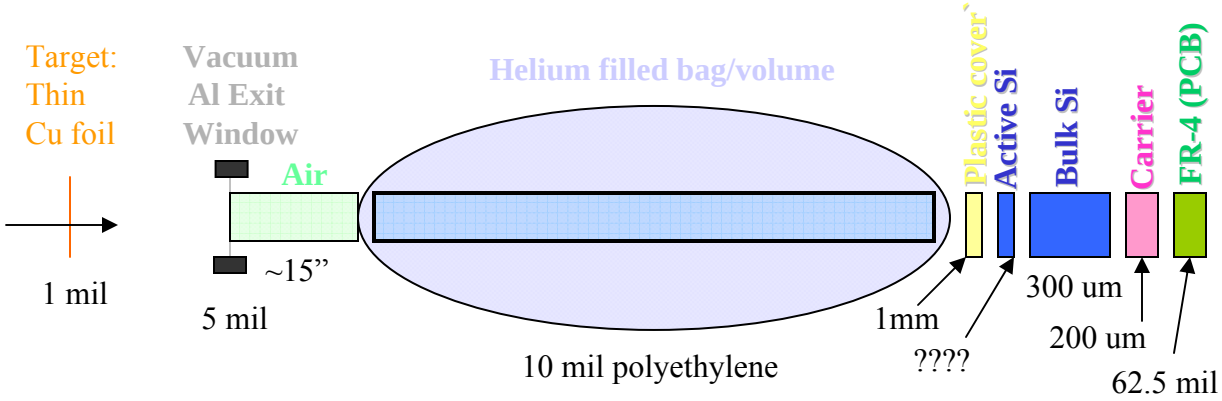
Brem beamline Summary

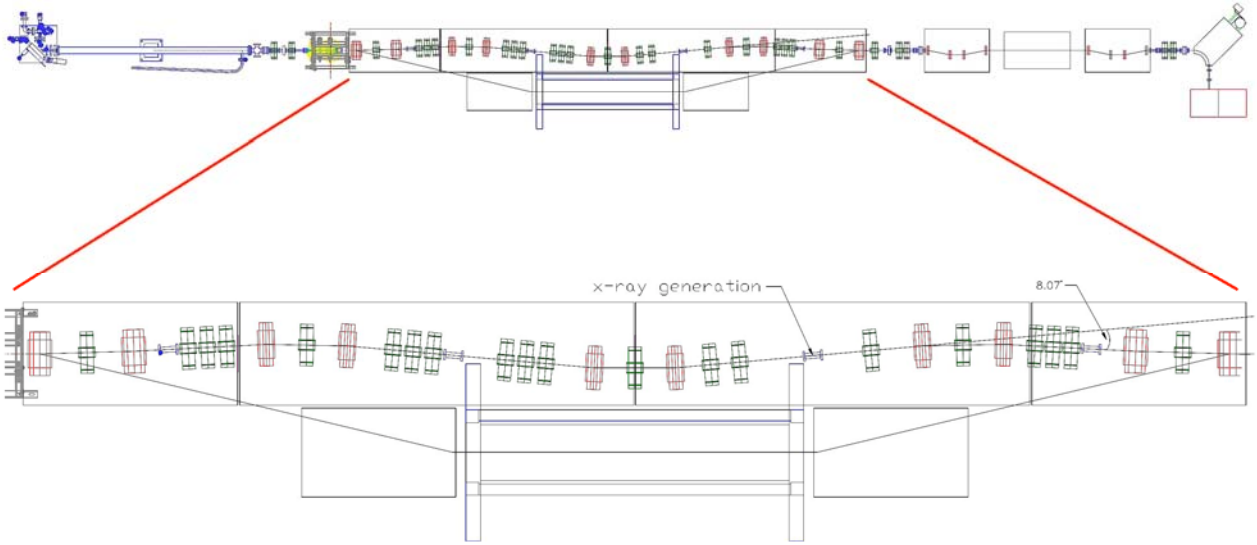
- Initial run with 2 detector planes
  - 1mm2 array for “bare” layer
  - 3mm2 array with BaF2 radiator
- More than adequate flux (2nd layer)
- Developing x-ray transport simulation
  - Schematic entry/board layout
  - Readout/ASIC design specifications fixed

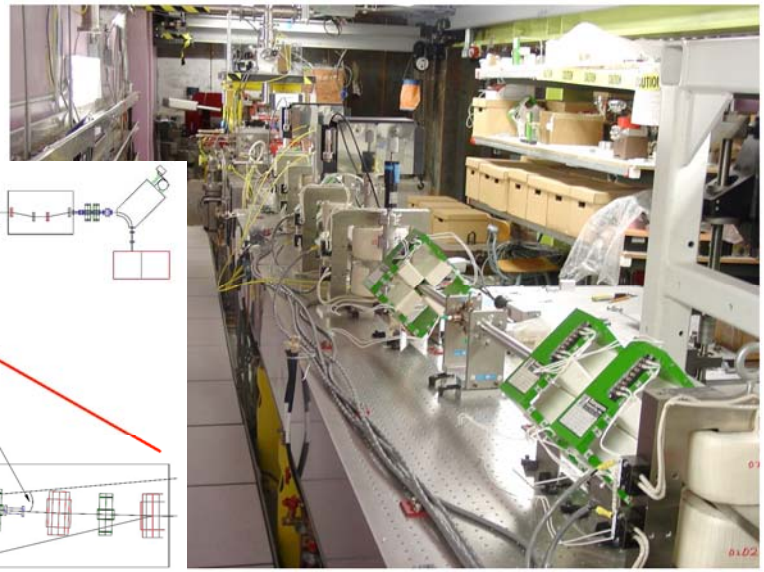
Bremsstrahlung Beamline Estimates

At the end of the line…

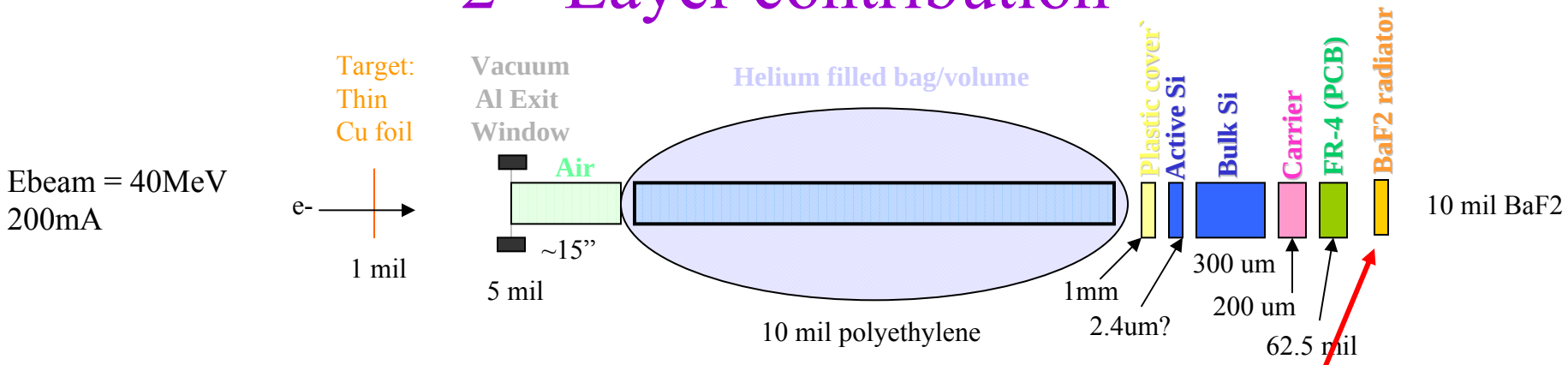


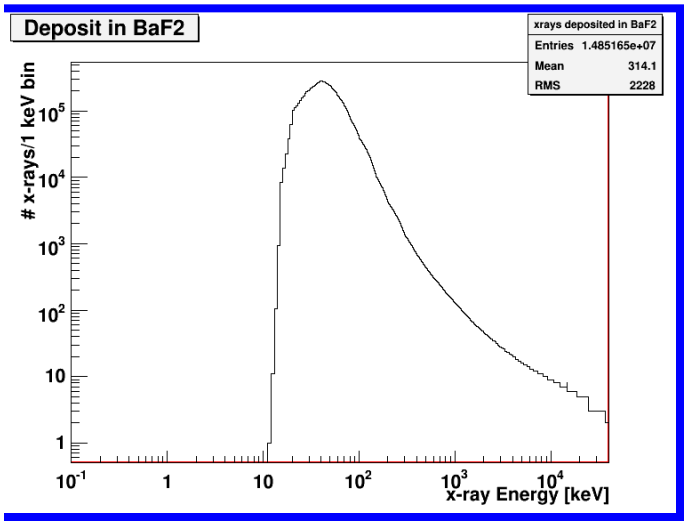




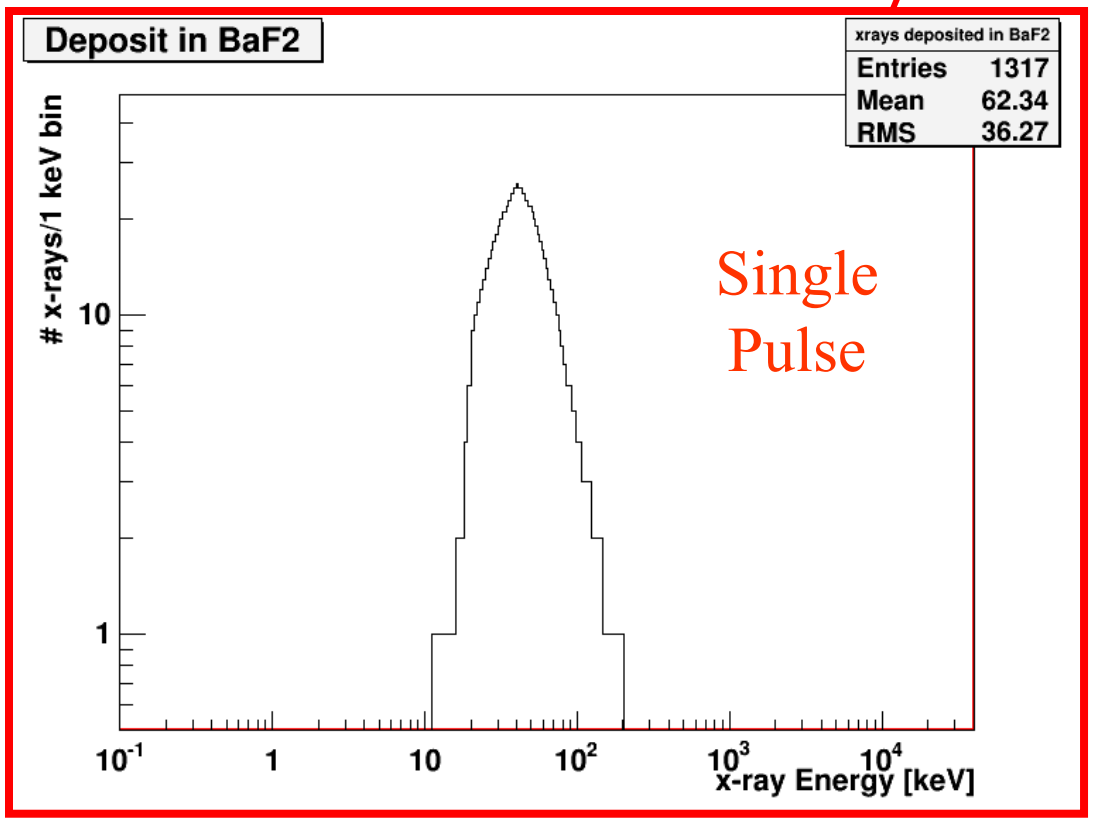


2nd Layer contribution

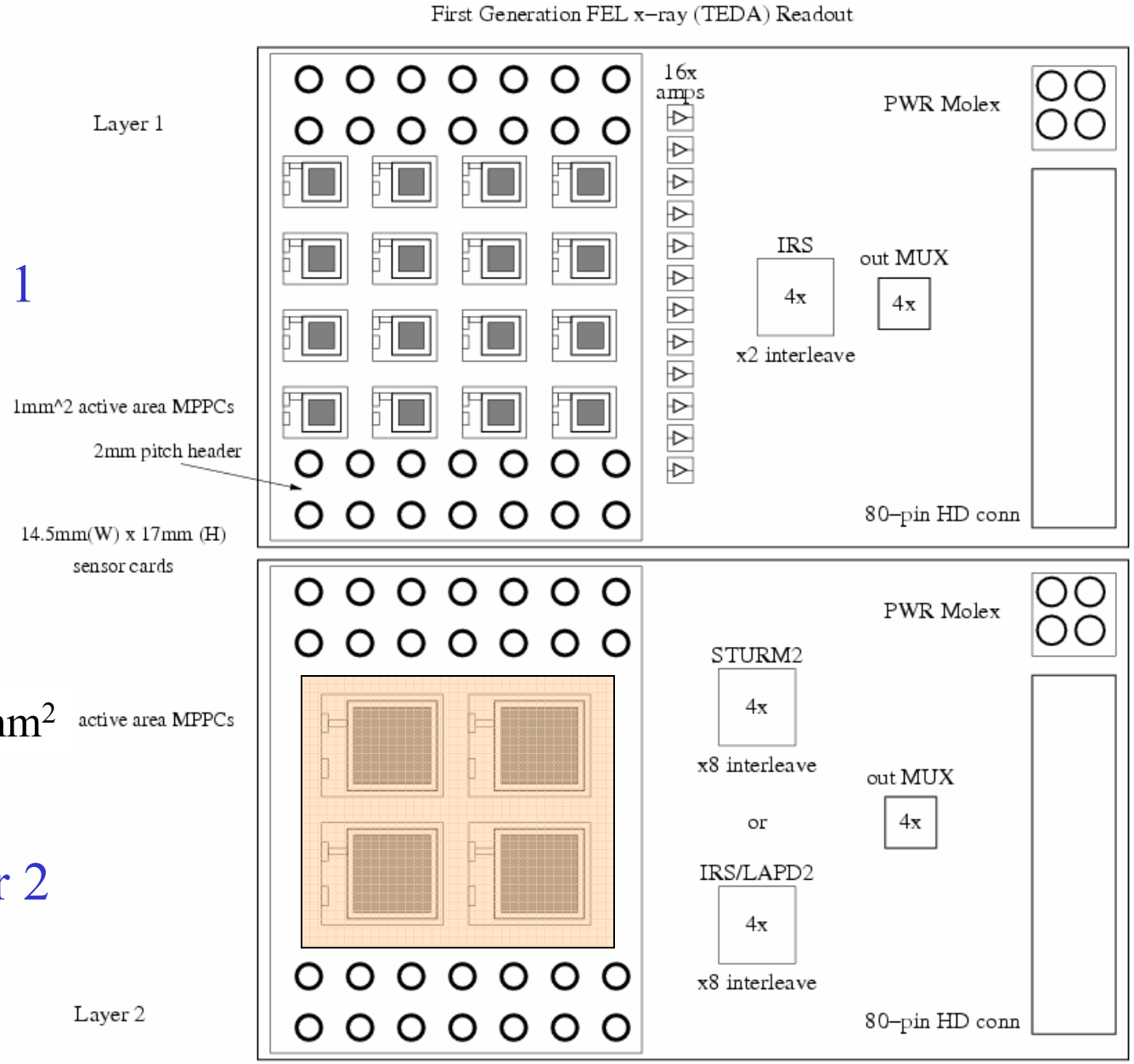




Macropulse



First Detector Arrays



Layer 1

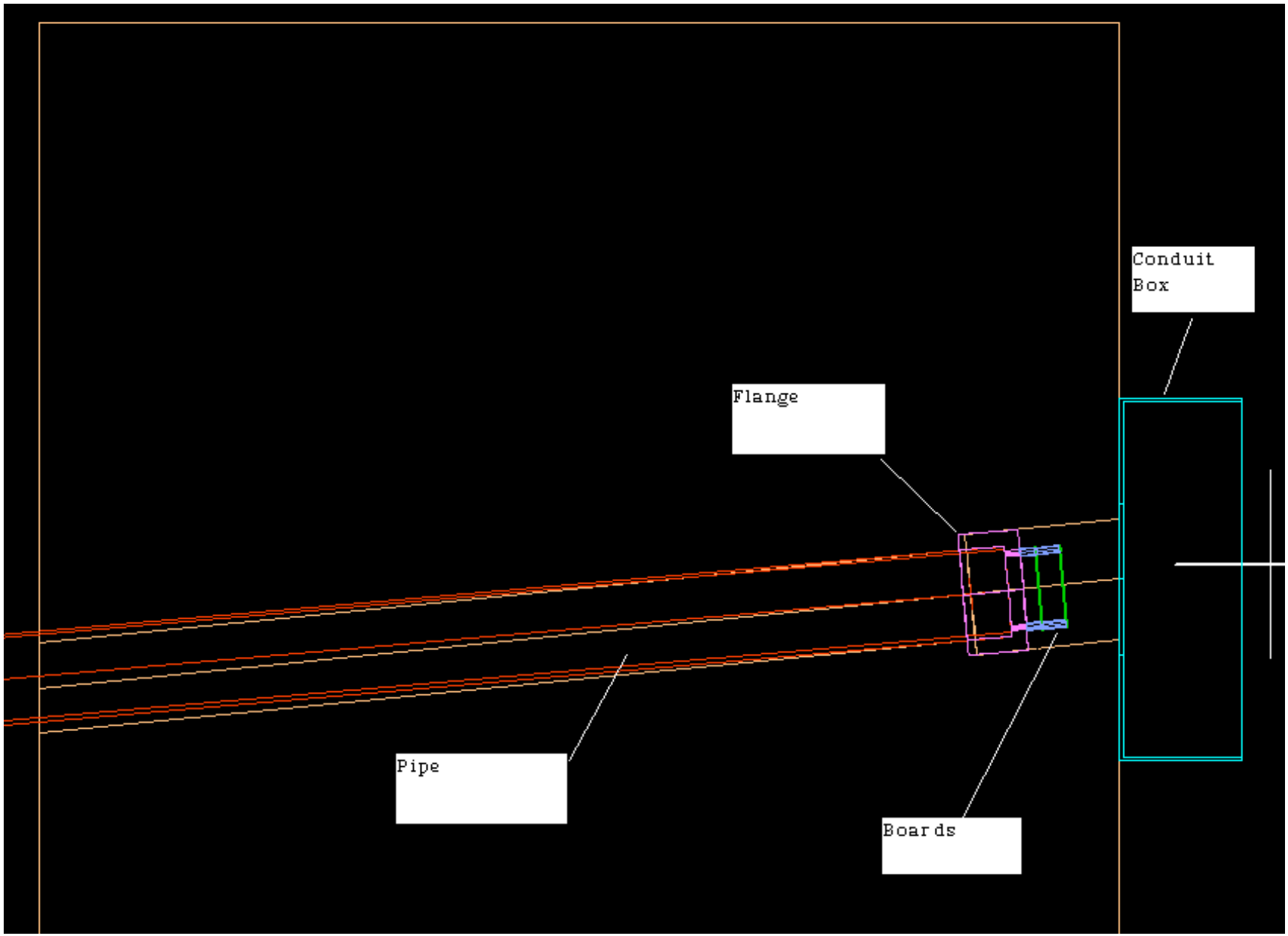
Layer 2

BaF_2 Specs [Mike H]

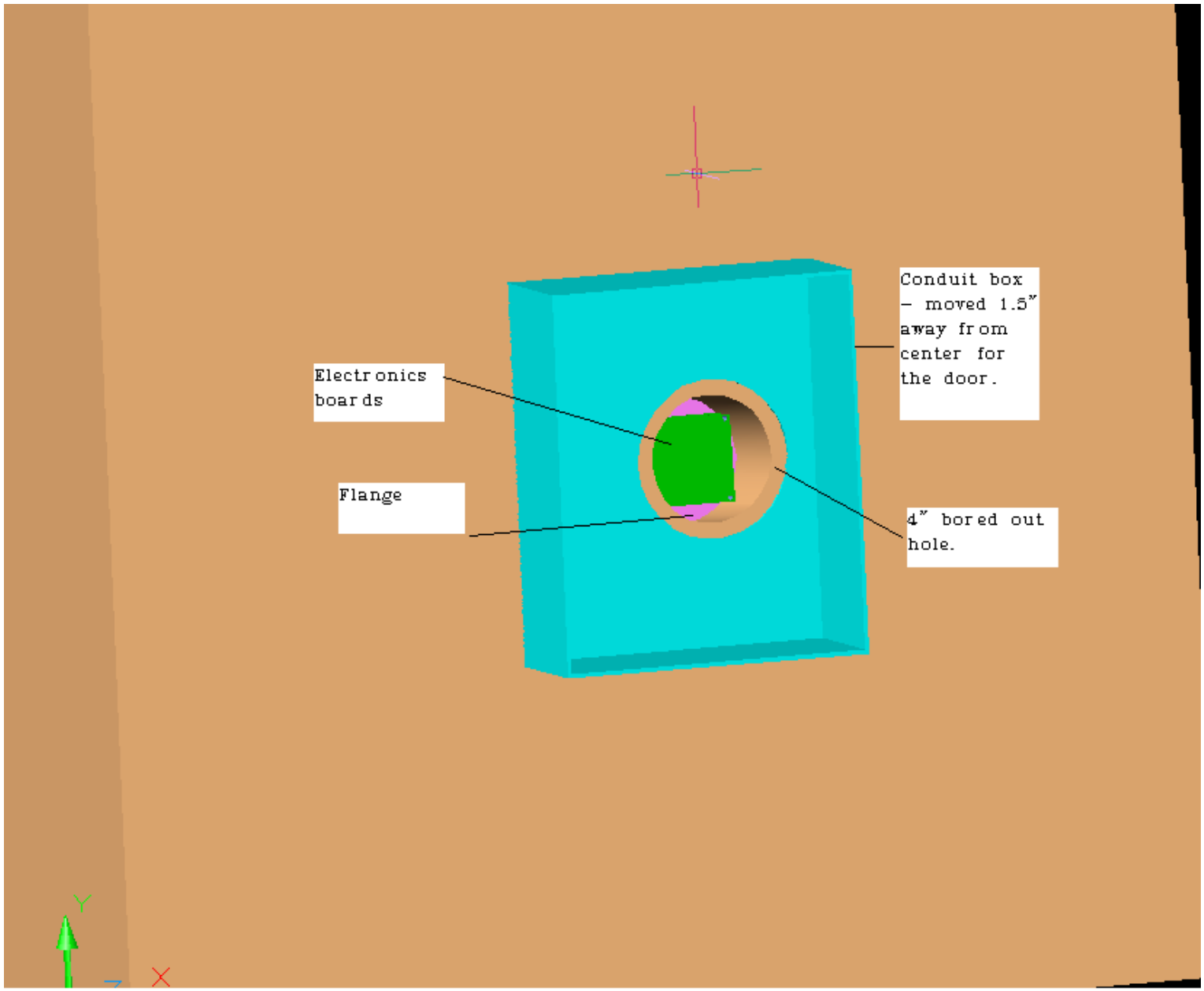
Qty: 2
Material: BaF2
Dimensions: (10.0 mm x 10.0 mm) ± 0.2 mm
Thickness: 0.30 mm ± 0.05 mm
Clear aperture: 85%
Parallelism: 3 arcmin
Flatness: λ/2 @ 633nm
Surface Quality: 40-20

These are the ISP optics catalog specs that they can readily achieve. I'm sure that they could do much better as well but I'm not sure what we want to pay for. I typically use optics that are at least λ/4 and 20-10. For such a thin optic however any polishing has to be balanced against the thickness tolerance of the optic.

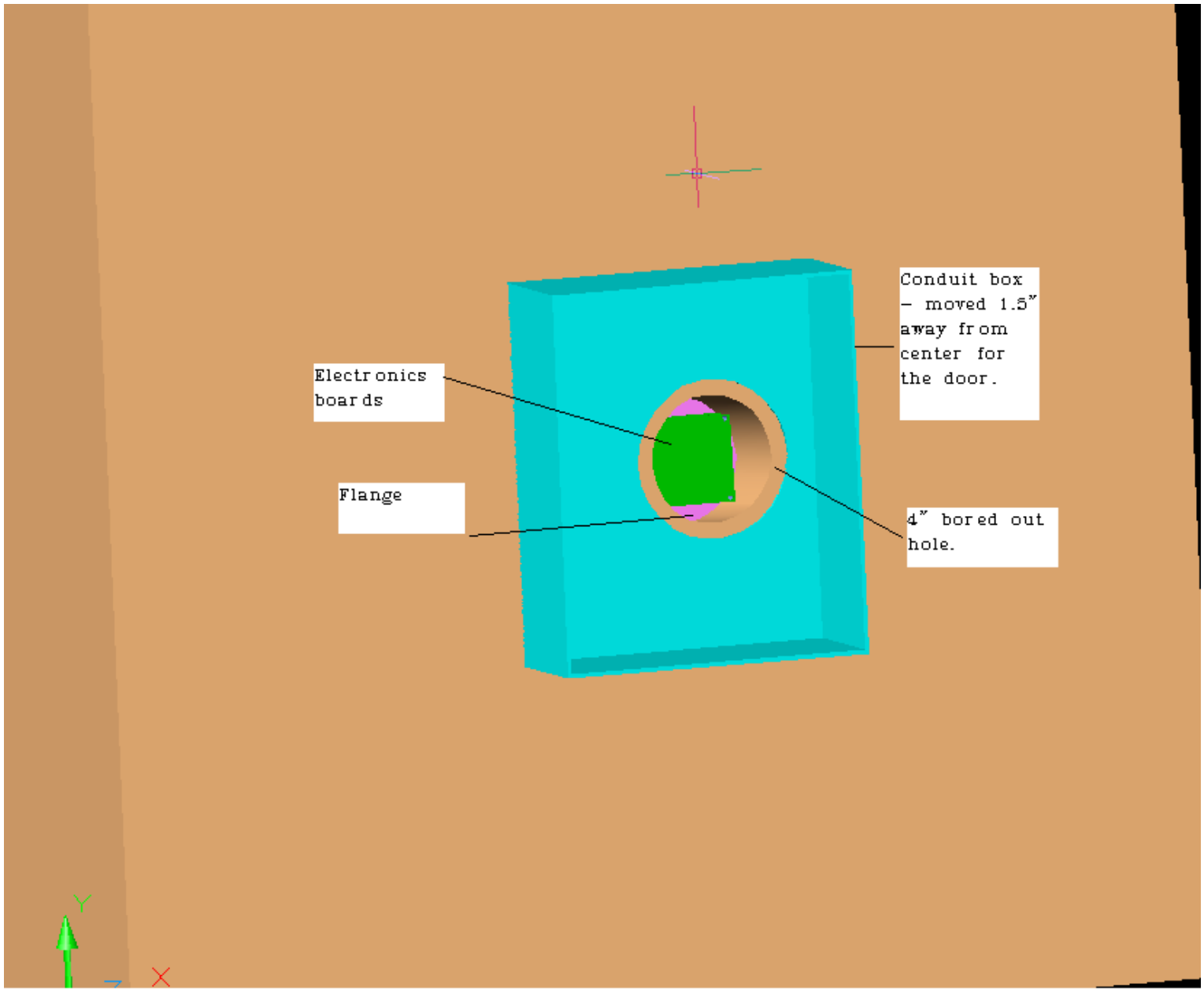
Target Layout (side) [Jim K]



Target Layout (escape maze) [Jim K]



Target Layout (escape maze) [Jim K]



Back-up slides