



CHARA Classic Throughput.





Data Pool: All 2004/5/6 Data:

- No fringe editing – underestimates visibility.
- Took approximately 30 minutes to crunch.
- $V < 0$ and $V > 1$ thrown away.
- Probably not reliable for science.
- K magnitudes extracted from 2MASS using Andy's Perl program 2MassQuery.



K Magnitudes are converted to a photon count.

- In K band there are 4.31×10^9 Photons $\text{m}^{-2} \text{s}^{-1} \mu\text{m}^{-1}$
- Two 1m telescopes: $2 \times \pi \times 0.25 = 1.57 \text{ m}^2$
- All data calibrated to 1 second.
- This assumes the NIRO readout mode behaves.
- K band is 0.35 μm wide.
- All of this results in

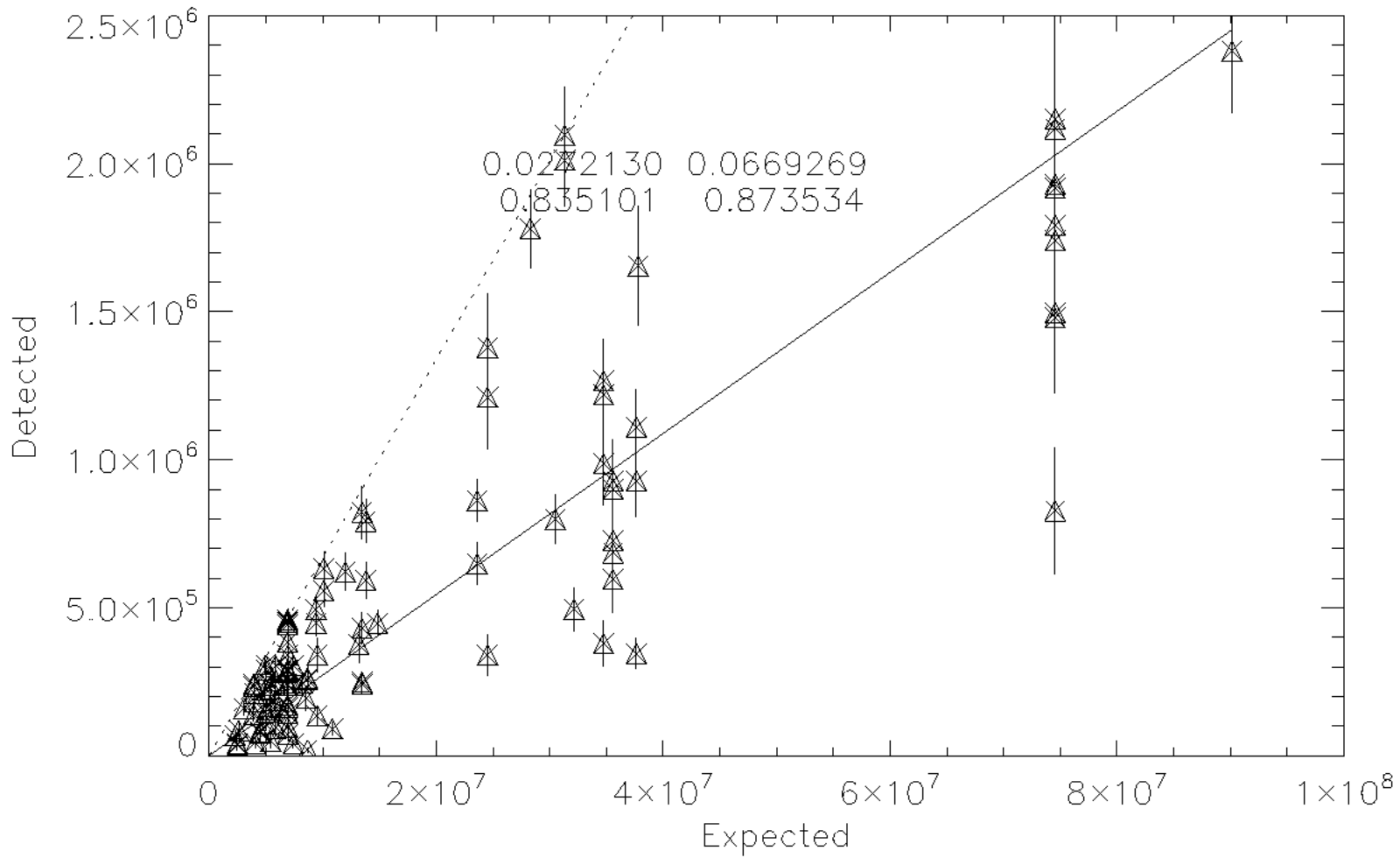
$$N_{\text{ph}} = 2.37 \times 10^{(9 - M/2.5)}$$

- Camera Gain = 0.3, DQE = 60%.



Example Data.

December 2006

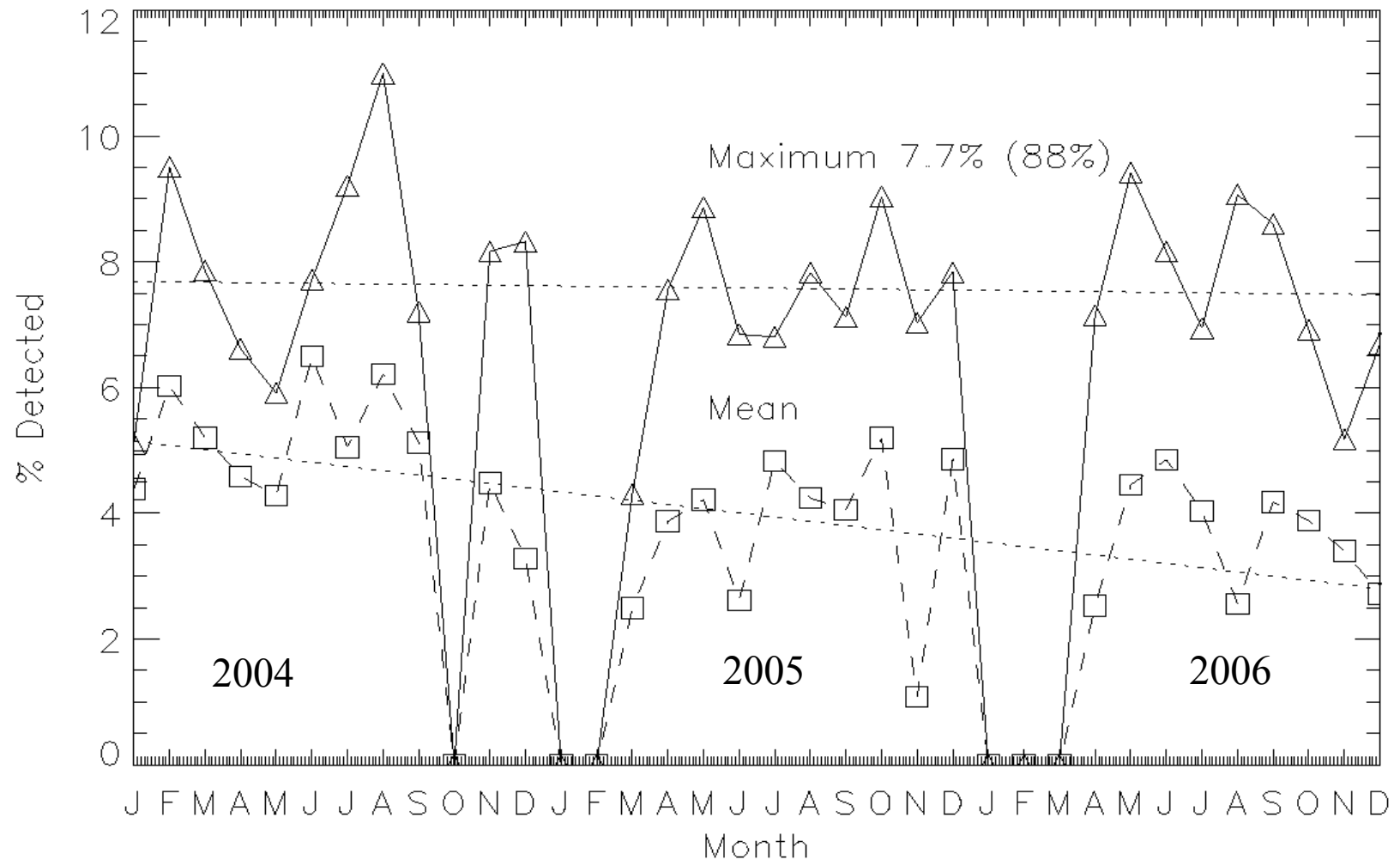


LESIA





Throughput results for each Month



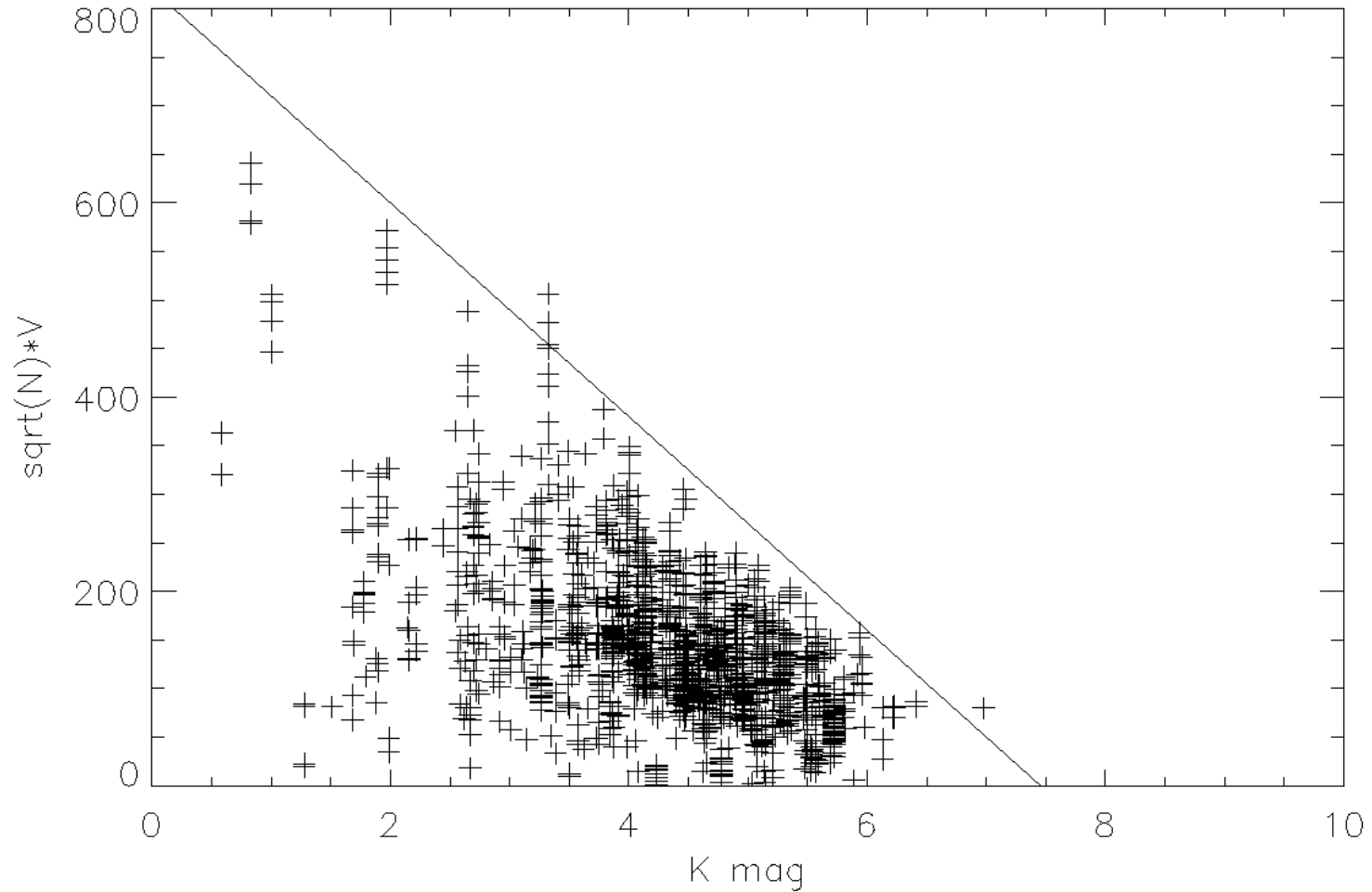
LESIA





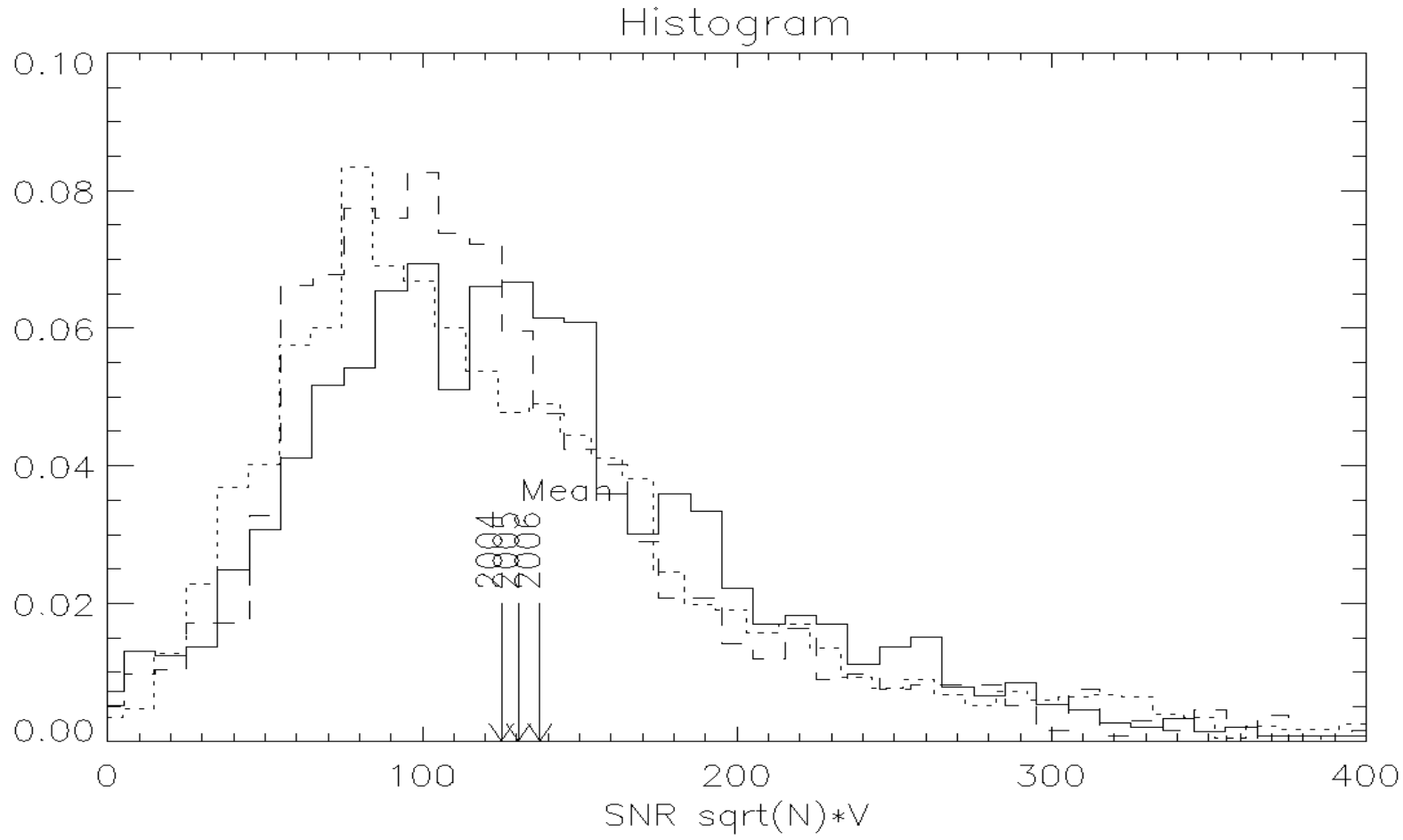
$$\text{SNR} \sim \text{sqrt}(N) * V$$

2006





SNR Continued



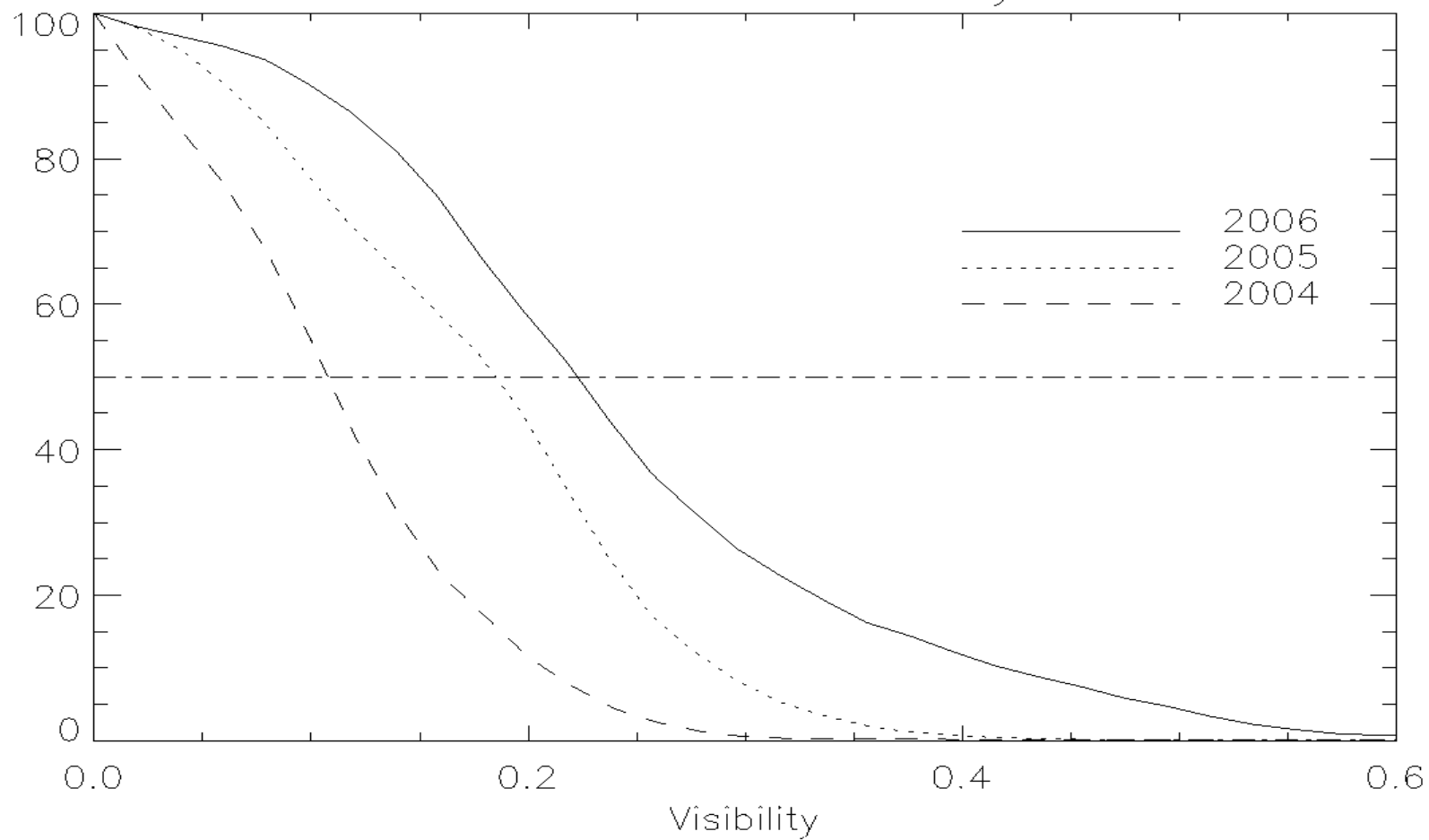
LESIA





Raw Visibility

Cumulative Probability

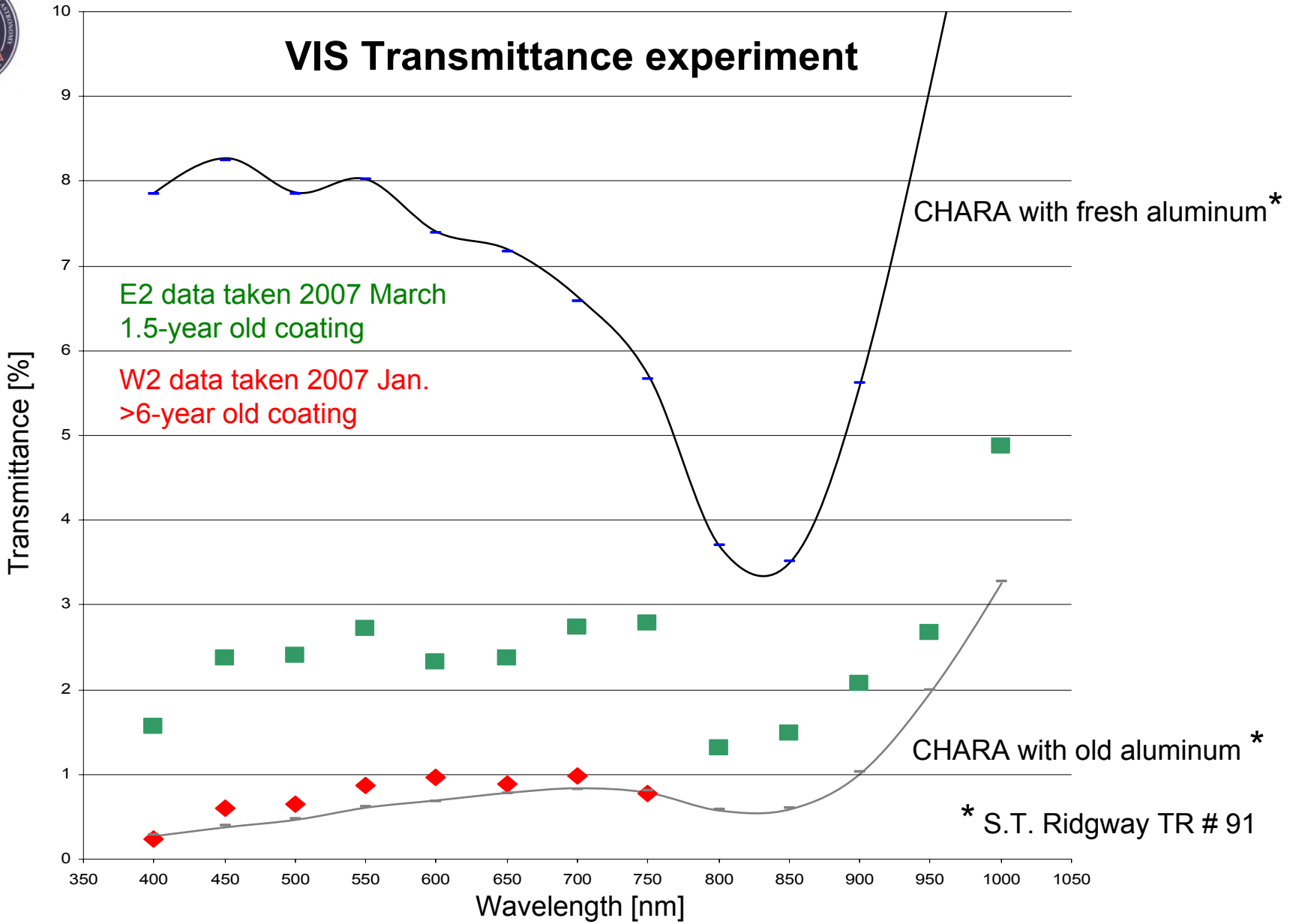


LESIA





VIS Transmittance experiment



LESIA





The Bottom Line

- K Band throughput is 8% (88% reflectivity)
- I/R Band throughput is 1% (3?8? 79-88% reflectivity)
- This year, as many mirrors as possible will be recoated with silver.
- This will probably not help in K so much but should help in I/R substantially.
- Further work on NIRO input optics will also help with both throughput and SNR.



Some Brief Comments on Metrology

- Parts are in hand for the first experiments in replacing the $\frac{1}{4}$ wave plates and adding new degrees of freedom in optical alignment.
- The first experiment in deriving the reference signal directly from the laser source using fibers only was successful. The parts are on order and the electronics modifications required are underway to fully replace the existing reference system.