

# SNAP Telescope

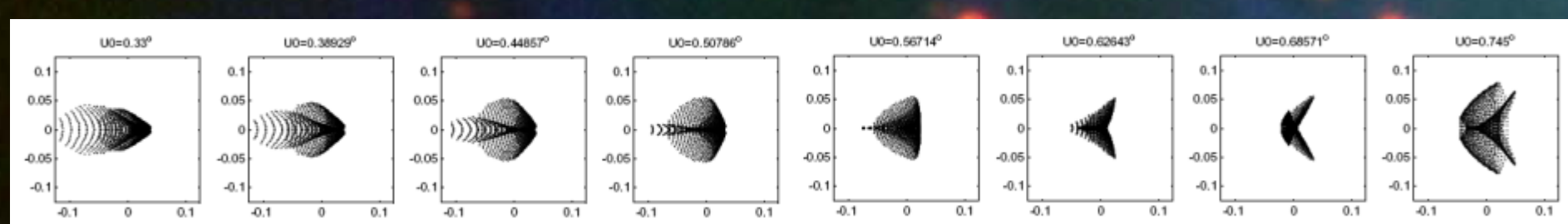
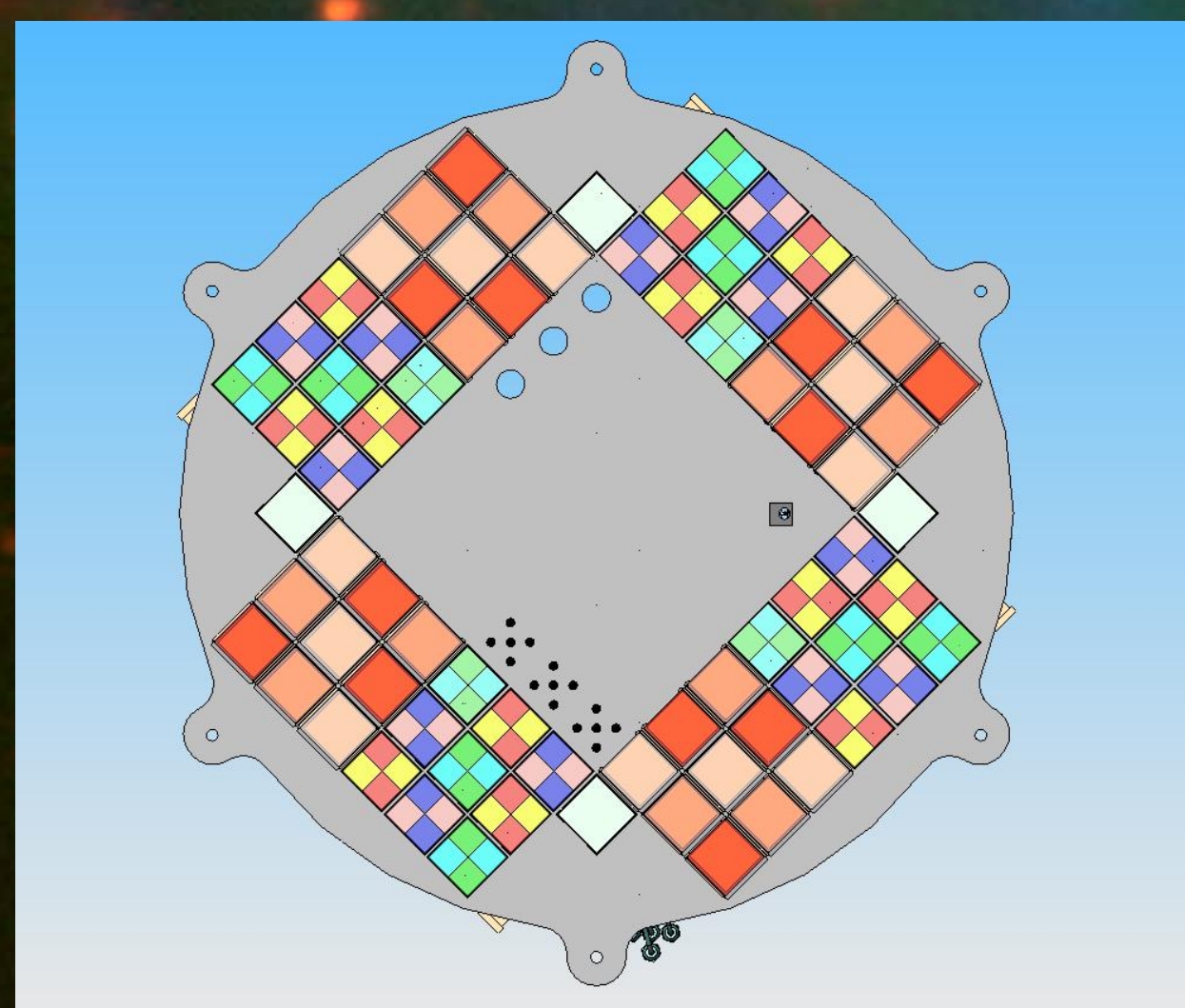
M.Lampton and M.Sholl for the SNAP Collaboration

## Science Requirements

- Deep repeated SNe photometry
- Wide field WL survey ~1000 sqdeg
- Visible and NIR, 0.4 to 1.7 microns
- Three year nominal mission
- These drive observatory design.....
  - \* 592 megapixel imager, 9 wavebands
  - \* Spectrometer with IFU, 0.4 to 1.7 microns
  - \* 0.7 sq deg instantaneous pixellized field
  - \* 70 deg solar avoidance angle

## Telescope basics:

- Annular field three-mirror anastigmat
- D.Korsch Appl.Optics 1972, 1977, 1980
- Flat focal surface
- No refractive correctors needed
- 2 meter class aperture
- Protected silver coatings
- EFL = 22 meters, f/11
- 105 microns/arcsecond plate scale
- 0.1 arcsec 10.5 um Si CCD pixels
- 1.56 deg (600mm) diameter annular field



## References:

- Lampton, M., et al 2002 "SNAP Telescope" Proc SPIE 4849, 215-226
- Lampton, M., et al., 2003, "SNAP Telescope: an Update" Proc.SPIE 5166, 113-123
- Sholl, M., et al., 2004 "SNAP Telescope" Proc SPIE 5487, 73-80
- Sholl, M., et al., 2005 "SNAP Point Spread Function" Proc. SPIE 5899, 27-38

Dumbbell Nebula, recorded with an LBL CCD, courtesy of NOAO

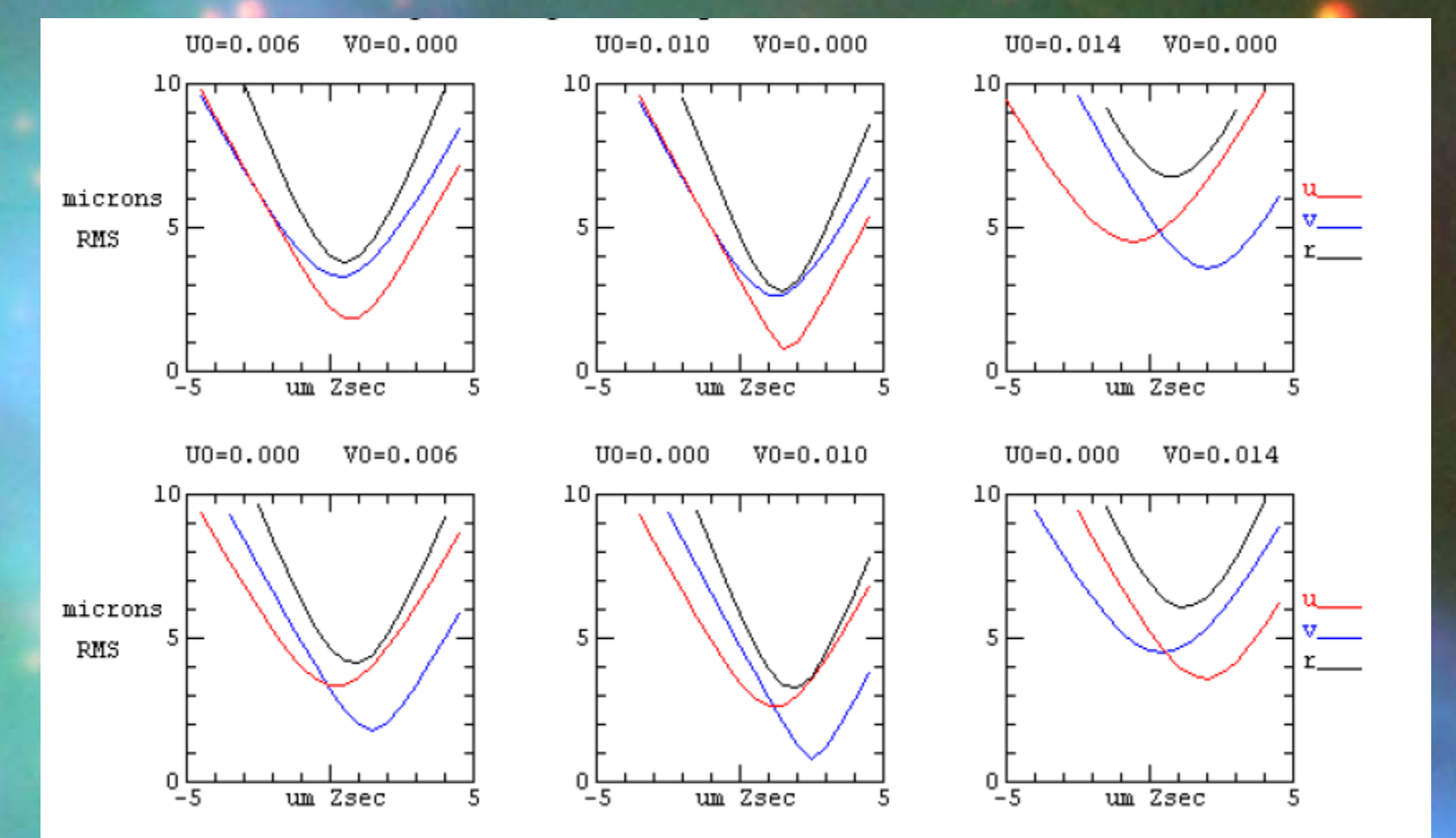


## Extreme PSF Stability:

- \* kinematically mounted optics
- \* thermally isolated from outer baffle
- \* passive thermal cooling of focal plane
- \* active thermal control
- \* benign L2 orbit location
- \* ULE™ and/or Zerodur™ optics
- \* carbon fiber cyanate ester structure
- \* comprehensive thermal modelling

## Tolerance Budget:

- \* Idealized TMA performance
- \* Mirror fabrication and test errors
- \* Structure: stability & stress/strain
- \* Surveying & metrology errors
- \* 1-G deformations: horiz and vert tests
- \* adjustment: 5-dof Secy
- \* Blur + ACS + diffraction + sensors



## Stray Light Analysis:

- \* Zodiacal light contribution
- \* Galactic midlatitude stars
- \* Scattered solar flux
- \* Earth, moon visible from L2
- \* Thermal emission from warm structure
- \* PST method
- \* ASAP tool set

## Continuing Work:

- Manufacturing alternatives
- Alternatives: ULE™ vs Zerodur™?
- Vendor facilities and capabilities
- Telescope test and qualification program
- Observatory Integration Plan

We gratefully acknowledge the support by the Office of Science, U.S. Department of Energy, through contract DE-AC03-76SF00098.

Visit us at <http://snap.lbl.gov>