

A new, large HST survey of trans-neptunian binary orbits: Strategy and early results

Will Grundy (Lowell Observatory), Keith Noll (STScI), Marc Buie (Lowell Observatory), Susan Kern (STScI), Denise Stephens (Brigham Young University), John Stansberry (University of Arizona), Hal Levison (SwRI)

We have just begun a large Hubble Space Telescope (HST) Cycle 16 survey of trans-neptunian binaries (TNBs). Our primary goal is to determine the mutual orbits of a sample of more than 20 of them in order to use the statistical characteristics of their orbits to probe their dynamical history. We also want to find out which TNB pairs have mis-matched colors, and compare their colors with dynamical properties to help constrain their formation conditions. With its extremely stable PSF and dark background, HST is the premier facility for resolving the very faint and close TNB pairs.

One key aspect of our program is the use of Monte Carlo techniques based on the statistical ranging methods of Virtanen et al. (2001, 2003, 2007) to achieve efficient scheduling of the HST observations. This approach allows us to use earlier observations to quantitatively constrain the possible orbital element space. Follow-up observations are scheduled at times when the remaining possible orbital elements are best distinguished on the sky plane.

Although most of the planned observations will not yet have occurred at the time of the meeting, we will present a few early results and will discuss our target sample and our observing and analysis strategies.