A distinguishing feature of transneptunian objects (TNO) is the high fraction that are binary. This is particularly true for the Cold Classicals (CC), objects in low *e* and low *i* orbits concentrated between the 3:2 and 2:1 mean-motion resonances. CCs have other physical markers: red colors, high albedos, and equal-mass binaries. The CCs appear to be a coherent and physically distinct population of planetesimals that has survived to the present with their physical properties relatively unaltered. Their spatial concentration between 39.4 and 47.7 AU has made identification of the CCs as a physical group possible. However, objects that started out as CCs are almost certainly ***not*** limited to this one dynamical niche. We can, therefore, use the measurable physical properties of CCs as tracers of Neptune-driven dynamical mixing in the Kuiper Belt.

As Neptune migrated, its mean-motion resonances preceded it into the planetesimal disk. The efficiency of capture into mean motion resonances depends on the smoothness of Neptune's migration and the local population available to be captured. The two strongest resonances, the 3:2 at 39.4 AU and 2:1 at 47.7 AU, straddle the core repository of the physically distinct CCs, providing a unique opportunity to test the details of Neptune's migration. Smooth migration should result in a measurable difference between the 3:2 and 2:1 with low inclination 2:1s having a red, binary population mirroring that of the CC itself while the 3:2 will be less contaminated. Alternative models with rapid migration would generate a more homogeneous result.

As Figure 1 shows, Resonant objects observed with HST show a higher rate of binaries in the 2:1 relative to the 3:2, significant at the 1σ level, suggestive of slow Neptune migration. Colors are available for only a fraction of these targets but a prevalence of red objects in outer Resonances has been reported. We report here on ongoing observations with HST in cycle 19 targeting ***all*** unobserved Resonants with observations that will measure color and search for binary companions using the WFC3.

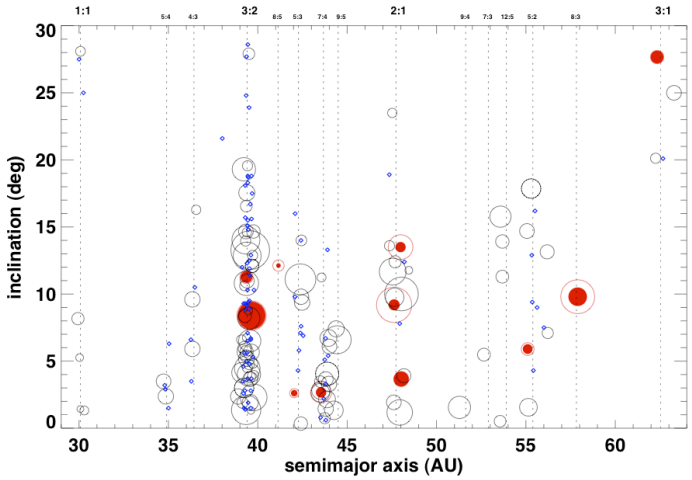


**Figure 1.** A plot showing Resonant TNOs ($H_V \geq 5$) observed with HST by our team. The locations of mean motion resonances of Neptune are shown with dashed lines. The size of the circle is proportional to the absolute magnitude, $H_V$ (and size for constant albedo). Binaries are shown in red with the size of the primary shown as the open red circle and the secondary indicated by the smaller, concentric, filled circle. Nearly equal size binaries are indistinguishable from a single filled red circle. Small blue diamonds mark unobserved Resonants.