

The Colors of Kuiper Belt Objects in Mean Motion Resonance with Neptune.Scott S. Sheppard¹ and S. Benecchi¹¹Department of Terrestrial Magnetism, Carnegie Institution of Washington,
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New optical colors of 52 objects in mean motion resonance with Neptune were obtained at the Magellan 6.5 meter telescope. The various Neptune resonant populations were found to have significantly different surface color distributions.

The Neptune Trojans (1:1 resonance) are only slightly red, similar to the Jupiter Trojans. The inner 4:3 mean motion resonance with Neptune only has one ultra-red object, which happens to be the only object measured for its color with an inclination significantly below 10 degrees. The other 4:3 objects have moderately red colors.

The 5:3 and 7:4 mean motion resonances have semi-major axes near the middle of the main Kuiper Belt and both are dominated by ultra-red material, similar to the low inclination "Cold" classical Kuiper Belt objects. Both of the 5:3 and 7:4 populations have mostly known low inclination objects with a few of the higher inclined objects ($i > 10$ deg) appearing to be less red.

The 2:1 mean motion resonance, which is near the outer edge of the main Kuiper Belt, has a large range of colors with similar numbers of moderately red and ultra-red objects at all inclinations. The 2:1 resonance also has a very rare neutral colored object showing that the 2:1 resonance is really a mix of all object types.

The distant 5:2 mean motion resonance appears to be dominated by moderately red objects and independent of inclination. The inner 3:2 resonance has a large range of objects from neutral to ultra-red independent of inclination. The 5:4, 9:5, 12:5, 7:3, 3:1 and 11:3 Neptune mean motion resonances all have three or less objects with measured colors and thus do not have usable statistics to interpret their color distributions.

It is apparent that each of the main Neptune mean motion resonances have distinct Kuiper Belt color populations with some showing a possible inclination dependence with color. The color of objects in mean motion resonance with Neptune are likely a result from the disruption of the primordial Kuiper Belt from the scattering and migration of the giant planets.

This work has been submitted for publication, which is expected in late 2012.