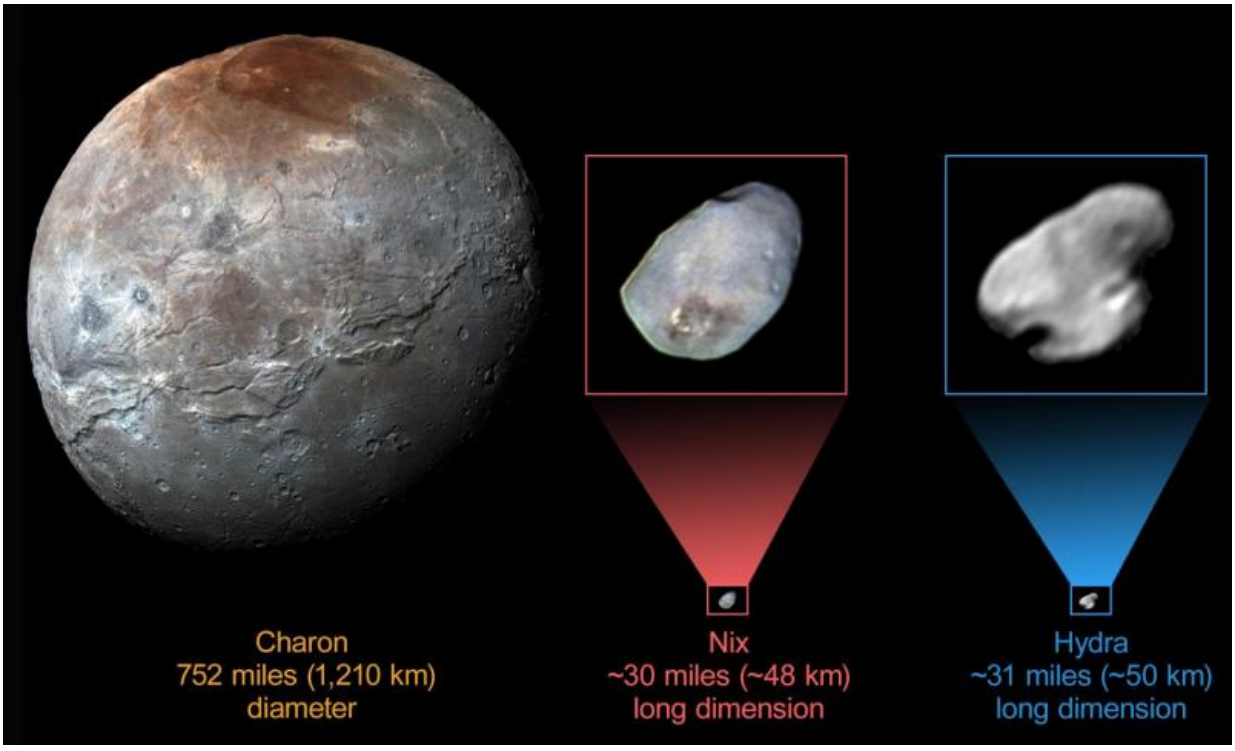
New data compare, contrast Pluto's icy moons

June 20 2016



Pluto’s moons Charon, Nix and Hydra. Charon and Nix were imaged in color by NASA’s New Horizons spacecraft, but Hydra was not. Credit: NASA/JHUAPL/SwRI

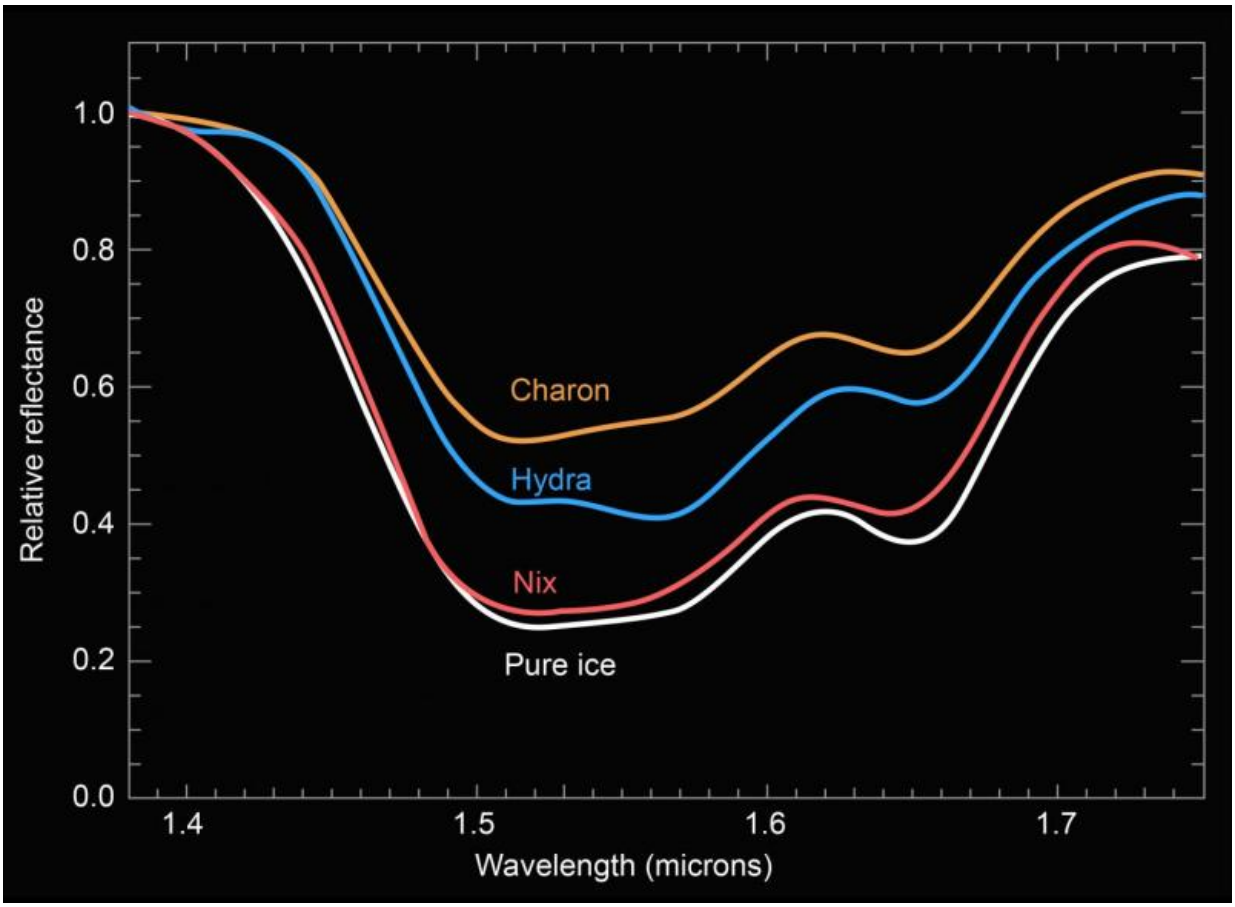
A newly downlinked spectral observation of Pluto's moon Nix from NASA's New Horizons spacecraft provides compelling evidence that its surface is covered in water ice, similar to what the New Horizons team

discovered recently for another of Pluto's small satellites, Hydra. This new result provides further clues about the formation of Pluto's satellite system.

With this observation by New Horizons' LEISA – the compositional spectral imager aboard the spacecraft – mission scientists also are piecing together a more detailed picture of Pluto's system of four small, outer moons (Styx, Nix, Kerberos and Hydra).

The deeper spectral features on Nix seen in the graph above are a signature of water ice that is relatively coarse-grained and pure, because the shape and depth of water-ice absorption depends on the size and purity of the icy grains on the surface. Scattering from smaller, or less pure, icy grains tends to wash out spectral absorption features, making them shallower.

"Pluto's small satellites probably all formed out of the cloud of debris created by the impact of a small planet onto a young Pluto," said New Horizons Project Scientist Hal Weaver, of the Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. "So we would expect them all to be made of similar material. The strong signature of water-ice absorption on the surfaces of all three satellites adds weight to this scenario. Although we didn't collect spectra of Pluto's two tiniest satellites, Styx and Kerberos, their high reflectivity argues that they are also likely to have water-ice surfaces."



A comparison of the compositional spectra of Pluto's moons Charon, Nix and Hydra to pure water ice. Nix's surface displays the deepest water-ice bands seen among Pluto's three satellites – Charon, Nix and Hydra – for which New Horizons obtained surface spectra. Credit: NASA/JHUAPL/SwRI

The difference in the depths of the water ice absorption features in the Nix and Hydra spectra raises new questions. Specifically, the science team is puzzling over why Nix and Hydra apparently have different ice textures on their surfaces, despite their similar sizes. Another mystery resulting from the Pluto flyby data is why Hydra's surface reflectivity at visible wavelengths is higher than Nix's – a New Horizons result published in March in the journal *Science* – even though Nix's surface

appears to be icier, implying higher reflectivity at visible wavelengths.

The LEISA Nix observation was captured on July 14, 2015, from a range of 37,000 miles (60,000 kilometers), resulting in a spatial resolution of about 2.3 miles per pixel (3.7 kilometers per pixel).

Provided by NASA