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Abstract

Ices of Pluto and the Kuiper Belt Objects

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Pluto and its three known satellites are the principal targets of the New Horizons mission currently in progress. The encounter with Pluto will occur in July, 2015, after which the spacecraft will continue into the Kuiper Belt, with the expectation that it can encounter one or two of these bodies during the mission lifetime. Our advance knowledge of Pluto, gained from telescopic studies at Earth, includes an inventory of frozen materials and organic solids on its surface. These ices and organics are thought to be preserved remnants of the materials from which Pluto and other bodies in the outer Solar System condensed during the epoch of planet formation. Our best estimates of the nature of Pluto's surface and interior come from comparisons with Neptune's largest satellite, Triton, which was explored in 1989 by the Voyager 2 spacecraft in a flyby that revealed its surface structures, dimensions, density, and contemporary geological activity.

Beyond Pluto, the icy bodies of the Kuiper Belt, of which at least 1000 are now known, show compositional and dynamical diversity; some are similar to Pluto, but others appear to be very different. The telescopic exploration of the Kuiper Belt continues, as the New Horizons spacecraft speeds toward the outer fringes of the Solar System.