Researchers Describe Discovery of Pluto's New Moons (Forwarded)

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Researchers Describe Discovery of Pluto's New Moons

New Hubble Images Offer Best View yet of Distant Planet and its Three Satellites

In the Feb. 23 issue of the journal Nature, a team led by Dr. Hal Weaver of the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Md., describes its discovery of two new moons around Pluto −− a finding that made the ninth planet the first Kuiper Belt object known to have multiple satellites.

In a companion paper, also in the Feb. 23 Nature, discovery team members led by Dr. Alan Stern of the Southwest Research Institute, Boulder, Colo., conclude that the two small moons were very likely born in the same giant impact that gave birth to Charon. They also argue that large binary Kuiper Belt objects like Pluto−Charon may also have small moons accompanying them, and that Pluto's small moons may generate debris rings that orbit the planet.

The Kuiper Belt is a band of icy, rocky objects and dwarf planets that orbit the Sun in the outer region of our solar system, beyond the orbit of Neptune. It has been known since 1992; Pluto is its most prominent member.

Using the Hubble Space Telescope's Advanced Camera for Surveys, the team originally discovered the moons in two sets of Pluto observations in May 2005. Their discovery was confirmed in new Hubble images taken Feb. 15 and released today.

"We used Hubble's exceptional resolution to peer close to Pluto and pick out two small moons that had eluded detection for more than 75 years," says Weaver, who also serves as project scientist for NASA's New Horizons mission, which is on track to make the first close−up reconnaissance of the Pluto system in 2015.

Pluto's previously known moon, Charon, was discovered in 1978, nearly half a century after Pluto's discovery in 1930. With diameters estimated to lie between 35 and 100 miles, the new moons, provisionally designated S/2005 P1 and S/2005 P2, are roughly 10 times smaller than Charon. They're also about 600 times fainter than

Charon and 4,000 times fainter than Pluto, and hidden in the glare of nearby Pluto and Charon when viewed by ground−based optical telescopes. The scientists say this is the reason the moons evaded detection before Hubble looked for them.

The Weaver team writes in Nature that the satellites were easy to see in the Hubble pictures. "That was somewhat surprising because ground−based observers had been trying for more than a decade to find new satellites around Pluto," says Max Mutchler, from the Space Telescope Science Institute in Baltimore, and the first person to spot the moons in the May 2005 images. "But I felt almost certain even when I first saw them that they were real objects −− not any sort of artifact −− and that they were exhibiting orbital motion around Pluto."

That orbital motion −− inferred from the different locations of the moons in pictures taken May 15 and May 18 −− is what convinced scientists that they were indeed looking at moons and not stray light, cosmic rays or other Kuiper Belt objects that happened to be passing by.

"If we assumed the orbits were circular and in the same orbit plane as Charon, we could predict the exact positions of the objects on the second day," says Dr. William Merline, a co−author and discovery team member from Southwest Research Institute (SwRI). "When the objects on the second day appeared almost exactly where we predicted, we were convinced −− no two artifacts could follow the rules of orbital physics that 'real' objects must obey."

"The presence of the new moons in orbits with so many similarities to Charon's sheds light on the formation and evolution of the Pluto system, as well as on the process by which satellites are formed in the Kuiper Belt," says SwRI's Stern, who is principal investigator of the New Horizons mission.

The new moons will be important targets of New Horizons, which was launched Jan. 19 to provide the first detailed reconnaissance of Pluto and the Kuiper Belt. The New Horizons spacecraft will fly within several thousand miles of Pluto and its moons in July 2015.

Weaver says the APL−built Long Range Reconnaissance Imager (LORRI) telescopic camera on New Horizons should be able to probe the new moons and resolve surface features down to 600 yards wide. These observations build on primary mission science plans to characterize the global geology and geomorphology of Pluto and Charon, map their surface compositions and temperatures, and examine Pluto's atmospheric composition and structure. New Horizons also will map the two smaller satellites in color and black−and white, and map their surface compositions and temperatures.

"We're getting four fascinating targets for the price of two," says Weaver. "The opportunity to explore the 'bookends' of Kuiper Belt object size distribution, with Pluto and Charon at one end and P1 and P2 at the other, is an unexpected treat."

The team is already analyzing the new Hubble images, which confirm the results published in the Nature paper and provide the most detailed view yet of this fascinating mini solar system. Hubble is scheduled to take another set of Pluto images in early March.

"The more we learn about the orbits and physical properties of P1 and P2, the better we can fine−tune our spacecraft investigation and focus on the objectives that are impossible to achieve from Earth−based observations," says Stern.

The Hubble Pluto companion search team also includes Dr. Marc Buie of Lowell Observatory, Flagstaff, Ariz., and Dr. John Spencer, Dr. Eliot Young, Dr. Leslie Young and Dr. Andrew Steffl of Southwest Research Institute, Boulder.

New Horizons is the first mission in NASA's New Frontiers Program of medium−class spacecraft exploration projects. Stern leads the mission and science team as principal investigator. APL manages the mission for NASA's Science Mission Directorate and is operating the spacecraft in flight.

On the Web:

* Hubble/Pluto System images
http://hubblesite.org/news/2006/09
* NASA's New Horizons mission
http://pluto.jhuapl.edu

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