New Horizons: First Scientific Results

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Discovery of Pluto (1930)

Percival Lowell (1855-1916)

Clyde Tombaugh (1906-1997)
DISCOVERY OF THE PLANET PLUTO

January 23, 1930

January 29, 1930
Discovery of Pluto’s main moon (1978)

The discovery photograph (Pluto + Charon; Charon is the blob)

Christy & Harrington
Hubble: July 2012

- Nix
- Styx
- Hydra
- Pluto
- Charon
- Kerberos
The origin of Charon?
The clearest map of Pluto prior to New Horizons (Buie et al., 2010)
The Third Zone

Pluto’s orbit

Neptune’s orbit

The Kuiper Belt
Triton (Neptune moon)
What we expected to see
(What we didn’t see)
New Horizons

Finally, a mission to complete the inventory
New Horizons: Mission Objectives

- Map surface composition of Pluto & Charon
- Characterize geology and morphology of Pluto, Charon & new satellites
- Characterize the atmosphere of Pluto and its evolution
- Search for an atmosphere around Charon
- Map temperatures on Pluto & Charon
- Search for rings and additional satellites around Pluto
- PLUS... conduct similar investigations of one or more Kuiper Belt Objects
New Horizons: Basics

Ralph: Visible and IR spectrometer: composition and temperature of surface of Pluto, Charon, and new moons

Alice: Ultraviolet spectrometer: atmospheric detection and structure

LORRI: Camera to study geology; look for moons and rings

REX: Radio science experiment: atmospheric temperature and composition

SWAP: Solar wind studies

PEPPSI: Energetic particle detector

SDC: Student dust counter

http://pluto.jhuapl.edu
Mission profile

- KBOs 2016–2020
- Pluto-Charon July 2015
- Jupiter System February 2007
- Launch January 2006
- Interplanetary Cruise March 2007—June 2015
NH LORRI OPNAV CAMPAIGN 1

2014-07-19 02:30:00 UTC
Distance to Pluto: 429375336 Km
(Proper Motion)
The solid lines are no frost transport; the data show sublimation in the bright regions in the past few decades.
Leisa spectrometer first results
Colors of Pluto and Charon
Nix and Hydra

42x36 km

55x40 km
The magnetosphere of Pluto: It has a tail!
Young people (postdocs especially) and women powered the *New Horizons* project.
Venetia Burney Student Dust Counter
Conclusions and future work

- Pluto has a complex geologic history, with evidence for seasonal volatile transport and active processes since its formation. Multiple events seem to have occurred. Many areas are crater-free.
- There are multiple compositional units.
- Most of the data has yet to be returned.
Extended mission

An extended KBO mission is planned, pending NASA approval. *New Horizons* plans on going to a small (<100 km) cold-disk KBO. At least two candidates were identified, with decision on the target due this summer.

Phoebe: a possible captured KBO similar to the own to be observed by *New Horizons*. 
INTERNED HEREIN
ARE REMAINS OF AMERICAN
CLYDE W. TONBAUGH,
DISCOVERER OF PLUTO AND THE
SOLAR SYSTEM’S "THIRD ZONE"
ADELLE AND MURON’S BOY,
PATRICIA’S HUSBAND, ANNETTE
AND ALDEN’S FATHER,
ASTRONOMER, TEACHER, PUNSTER,
AND FRIEND:
CLYDE W. TONBAUGH
(1906-1997)