Minor Body Science in the LSST Era

Michał Drahus, Piotr Guzik Astronomical Observatory of the Jagiellonian University

Background: key science themes of LSST

- The Nature of Dark Matter and Understanding Dark Energy
- Cataloging the Solar System
- Exploring the Changing Sky
- Milky Way Structure & Formation

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Background: minor body inventory from LSST

	Currently Known	LSST Discoveries	Median Number of Observations
Near Earth Objects (NEOs)	14 500	100 000	60 (D>250 m)
Main Belt Asteroids (MBAs)	650 000	5 500 000	200 (D>500 m)
Jupiter Trojans	6 000	280 000	300 (D>2 km)
Trans Neptunian Objects (TNOs)	2 000	40 000	450 (D>200 km)
Interstellar Objects (ISOs)		10	

Source: LSST Solar System Science Collaboration

Background: LSST data "products"

- Realtime: world-public stream of alerts (~10 million / night)
 Two ~30x30 px FITS, photometric, astrometric and shape characterisation, "history"
 Full stream & alert filtering service
- Every day: a catalog of orbits for LSST discoveries (~6 million objects / 10 yrs)
- **Every day:** a set of basic images (~20 TB of raw data / night)
- Every year: a time-resolved photometric multi-colour
 (u, g, r, i, z, y) catalog of moving bodies accurate to 5 mmag

Science: realtime alerts

Example 1: Comet outbursts



Science: realtime alerts

Example 2: Activity of asteroids





Science: realtime alerts

Example 2: Activity of asteroids



Science: daily orbits

Example 3: Interstellar minor bodies



Oumuamua była statkiem zwiadowczym wymarłej cywilizacji. Tak twierdzą naukowcy z Harvardu

"Może być wrakiem statku zwiadowczego, korzystającego z napędu znanego na Ziemi" No to naukowcom z Harvardu chyba przydarzyło się spalenie sporej ilości zioła, ktore to ostatnio zostalo zlegalizowane w USA dla celów leczniczych....



Science: custornised stacks of basic images

Example 4: Deep search for asteroid dust trails

Science: photometric catalog

Example 5: Long-term brightness anomalies

