



Active Asteroids

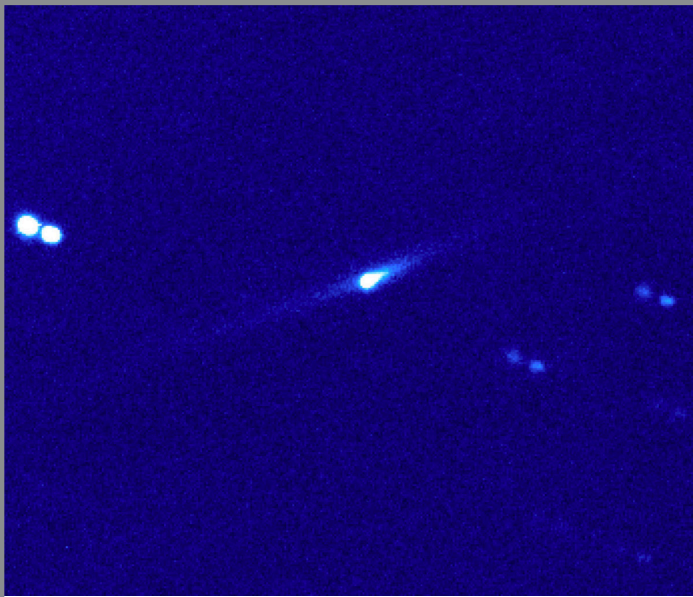


Image Credit: Henry Hsieh/ Pan-STARRS1 Science Consortium/IFA

This image of main-belt comet 288P, is the first of many active asteroids discovered by the Pan-STARRS1 survey. LSST should discover many more, providing exciting opportunities for advancing our understanding of these intriguing objects.

Active asteroids are objects that exhibit comet-like activity but are dynamically asteroidal. They include main-belt comets, whose activity is believed to be driven by the sublimation of volatile ice, like in classical comets, and disrupted asteroids, whose activity is believed to be produced by other mechanisms, such as impacts or rotational destabilization.

The discovery that main-belt comets still contain sufficient near-surface ice to drive cometary activity is surprising, given their apparently stable orbits in the main asteroid belt in the warm inner solar system.

Main-belt comets have also drawn considerable attention for their astrobiological significance, as they offer an opportunity for probing the ice content of the inner solar system, which is important for testing and constraining models of terrestrial planet formation and the primordial delivery of water to the Earth, which then sets the stage for the rise of life. Meanwhile, disrupted asteroids offer exciting in situ opportunities to study impact and rotational disruption processes that have previously only been studied in the lab or using computer modeling.

The discovery of more active asteroids is a high priority for Solar System scientists. Less than 30 active asteroids are currently known, most of them discovered by currently operating all-sky surveys at a rate of a few per year. With its larger mirror and increased sensitivity compared to current surveys, LSST may increase this discovery rate by 10-fold or more, enabling a far broader range of research into these mysterious objects than is currently possible.

See more at www.lsstssc.org

Photo Credit: PanSTARRS C/2017 S3 Michael Jager

