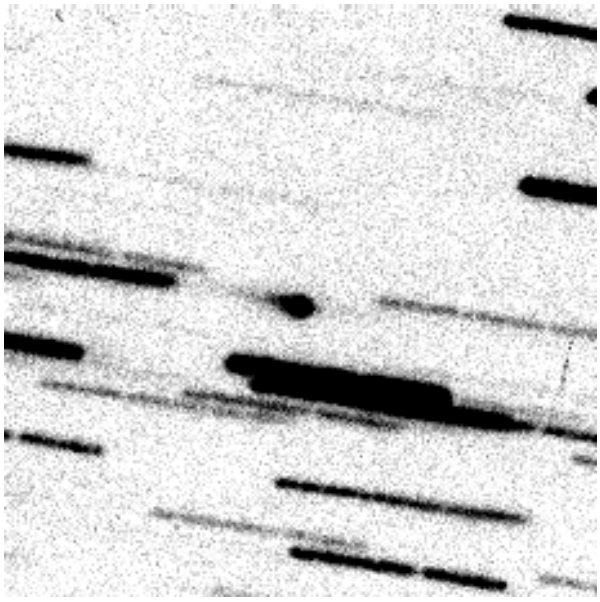
Photometry and Dust Modeling for Select Main-Belt Comets. J. Pittichová[1] and K. J. Meech[2], [1]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Dr. Honolulu, HI 86822, U.S.A, jana@ifa.hawaii.edu, [2]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Dr. Honolulu, HI 86822, U.S.A, meech@ifa.hawaii.edu.

We will present optical CCD photometry and Finson-Probstein (FP) dust modeling investigation for two Main-Belt Comets (MBC) 133P/Elst-Pizzaro and 176P/Linear. We obtained several pre-perihelion and post-perihelion observations of both comets, on 2007 June 18 using the Keck 10-m (LRIS optical CCD) and on 2007 October 13-14 using the UH 2.2-m (Tek2048 optical CCD) telescopes on the Mauna Kea for the comet 133P and on 2007 December 13 and 2008 March 26 for the comet 176P, using the UH 2.2-m telescope. Both comets were active and showed signs of coma pre-perihelion and comet 133P showed a well developed post-perihelion tail.

Comet nuclei are icy objects formed in the vicinity of the giant planets beyond the protoplanetary disk frost line and were scattered into the Kuiper Belt and beyond into the Oort Cloud (OC). They are believed to be some of the most primitive bodies in our Solar System. Once they approach the Sun inside the orbit of Jupiter, their ices become warm enough to sublimate, and characteristic comae and tails will develop around the cometary nuclei. There are two general dynamical families of comets, classified by derived orbital elements based on current observations. The short-period (SP) ecliptic comets originate in the Kuiper Belt (KB) and the long-period (LP) elliptical comet originate in the Oort Cloud (OC).

Asteroids, which are sometimes referred to as minor planets, are rocky, metallic bodies that revolve around the Sun, usually in a region known as the Asteroid Belt. The Main Asteroid Belt lies between the orbits of Mars and Jupiter and contains millions of asteroids and three comets, which belong to a recently discover new class comet, the MBC. Main-belt comets are bodies orbiting within the (main) asteroid belt, which show cometary activity during a part of their orbit. Unlike classical comets which spend most of their orbits at heliocentric distance beyond Jupiter, main-belt comets follow near-circular orbits within the asteroid belt that are indistinguishable from the orbits of many standard asteroids. The three known main-belt comets all orbit within the outer part of the main belt [1].

By studying the material ejected from a comet, it is possible to assess the nature of the volatiles and refractory material in the nucleus. For this reason, detailed studies of the cometary dust of this new cometary group (MBC) can provide important information and clues how much they are different or similar to the classical comets. We will report on our FP dust models to determine three basic parameters: the dust production rate, the particle distribution, and the emission velocity of the grains [2].



Composite image of comet 133P/Elst-Pizzaro on 2007 Oct 13, total exposure time is 5200sec, R filter, FOV is 50"x50", North is up and East is to the left.

Rerefences:

[1] Hsieh, H. H. and Jewitt, D. (2006) *Science*, *312*, 561-563

[2] Farnham, T. L. (1996) *PhD. thesis*, Univ Hawaii