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COMET C/2004 PY$_{42}$ (CINEOS)

W. Romanishin, University of Oklahoma; and S. C. Tegler, Northern Arizona University, report that the centaur-type minor planet 2004 PY$_{42}$ (cf. *MPEC* 2004-P48, 2004-Q30; *MPS* 111230), which was reported as asteroidal when discovered on CCD images taken in the course of the "Campo Imperatore Near Earth Objects Survey" (A. Boattini, F. De Luise, and A. Di Paola, 0.60-m $f/3$ Schmidt telescope; discovery observation given below), shows a faint asymmetric coma ($R \sim 21.5$), extending 4$''$ to the northwest, in six co-added 5-min R-band exposures obtained around June 7.4 UT and in eleven co-added 5-min exposures obtained around June 8.4 with the 1.8-m Vatican Advanced Technology Telescope. The additional astrometry, revised orbital elements (T = 2001 Apr. 24, q = 11.79 AU, e = 0.27, ω = 344°, Ω = 296°, i = 19°, equinox 2000.0; P = 64.8 yr), and an ephemeris appear on *MPEC* 2005-M12.

2004 UT	α_{2000}	δ_{2000}	Mag.
Aug. 10.87443	$20^{h}46^{m}08^{s}.00$	$-12°00'02''.7$	19.8

COMET C/2005 K2 (LINEAR)

Z. Sekanina, Jet Propulsion Laboratory, writes: "Applying a two-parameter version of my comet fragmentation model to 20 astrometric observations from 2005 June 10–16 (*MPEC* 2005-M11), I find the companion nucleus to have separated from the parent comet on 2005 Apr. 22 ± 2 and been subjected to a differential deceleration of 42 ± 2 units of 10^{-5} solar attraction. Solving in addition for a transverse or normal component of the separation velocity yields nearly the same time of breakup and the separation velocity much lower than 1 m/s. The companion is a fragment with a limited lifespan, possibly less than 100 days. The splitting may be responsible for the steep light curve and may have facilitated the comet's discovery on May 19. However, the apparent flare-up in early June (*IAUC* 8540) is not directly related to the described fragmentation event, a conclusion reached independently by J. A. Farrell (personal communication). Searches for the companion in existing images from late May and early June are encouraged, as additional data should assist in refining the fragmentation model. The predicted separation distances and position angles of the companion relative to the primary (0^{h} TT, equinox 2000.0): May 20, 4$''$, 266°; 25, 7$''$, 276°; 30, 11$''$, 9°; June 4, 18$''$, 42°; 9, 28$''$, 46°; 14, 39$''$, 48°; 19, 49$''$, 52°; 24, 57$''$, 59°; 29, 63$''$, 68°."

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