## Central Bureau for Astronomical Telegrams INTERNATIONAL ASTRONOMICAL UNION

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## S/2009 (93) 1 AND S/2009 (93) 2

F. Marchis and B. Macomber, Carl Sagan Center at the SETI Institute and University of California at Berkeley; J. Berthier and F. Vachier, Institut de Mécanique Céleste et de Calcul des Ephémérides, Observatoire de Paris; and J. P. Emery, University of Tennessee, Knoxville, report that adaptive-optics images were recorded of (93) Minerva, a large C-type mainbelt asteroid, with the 10-m Keck II telescope [+ NIRC2 camera (angular resolution up to 0".042, corresponding to a spatial resolution of 65 km) + Fe II filter (central wavelength at  $1.64~\mu m$ )] between Aug. 16.57 and 16.64UT, with the target at r = 2.117 AU and phase angle 20.0. The direct images reveal that the large minor planet has an almost-spherical shape with an average diameter of 145 km. Additionally, these observations show the presence of a companion  $\sim 4$  km in diameter at 0".41 (projected distance of 630 km) in p.a. 275° detected in every image recorded over the 1.8-hr baseline. Careful analysis of three images indicates the presence of a second satellite ( $\sim 3$  km) and located closer to the primary at an apparent distance of 380 km (0".25) in p.a. 209°. With (87) Sylvia (cf.  $IAU\bar{C}$  8582), (45) Eugenia (cf. IAUC 8817), and (216) Kleopatra (cf. IAUC 8980), this is the fourth multiple system with two small-kilometer-sized satellites to be discovered and imaged in the main asteroid belt.

## COMET C/2009 Q4 (BOATTINI)

A. Boattini reports his discovery of a strongly condensed comet with coma diameter  $\sim 8''$  (slightly elongated in p.a.  $250^{\rm o}$ ) in CCD images taken with the Catalina 0.68-m Schmidt telescope (discovery observation tabulated below); Catalina images taken by R. E. Hill on Aug. 28.4 UT show a small nuclear condensation with a 2" coma and a narrow tail  $\sim 10''-15''$  in p.a. 290°. Following posting on the 'NEOCP' webpage, R. Ligustri (Udine, Italy) writes that his CCD images on Aug. 29.4 (remotely using a 0.25-m reflector near Mayhill, NM) show a slightly diffuse coma with diameter  $\sim 15''$ . J. V. Scotti notes that images taken on Aug. 30.5 with the Spacewatch 1.8-m reflector show a 9" coma and a 0.68 tail in p.a. 257°.

2009 UT  $\alpha_{2000}$   $\delta_{2000}$  Mag. Observer Aug. 26.47241  $4^{\text{h}}27^{\text{m}}20.05$   $+8^{\circ}18^{'}42.1^{''}$  18.9 Boattini

The available astrometry, preliminary parabolic orbital elements [T=2009 Nov. 1.603 TT, q=1.50024 AU,  $i=11^\circ.627$ ,  $\omega=301^\circ.086$ ,  $\Omega=135^\circ.512$  (equinox 2000.0)], and an ephemeris appear on MPEC 2009-Q84.