S/2008 (216) 1 AND S/2008 (216) 2

F. Marchis, Carl Sagan Center at the SETI Institute and University of California at Berkeley; and his collaborators, P. Descamps and J. Berthier, Institut de Mecanique Celeste et de Calcul des Ephemerides, Observatoire de Paris; and J. P. Emery, University of Tennessee at Knoxville, report on observations of (216) Kleopatra, a large M-type main-belt asteroid, recorded with the 10-m Keck II telescope and its adaptive-optics (AO) system between Sept. 19.27 and 19.50 UT, when the target was at 1.237 AU with a phase angle of 7°.5. The direct images recorded with the NIRC2 camera reach an angular resolution up to 0′′.032 (corresponding to a spatial resolution of 29 km) with the J_cont filter (central wavelength at 1.21 µm), permitting confirmation that the primary has the “dog-bone” shape revealed by Ostro et al. (2000, Science 288, 836). The new AO data show additionally the presence of a ∼ 5-km-diameter companion at 0′′72 (projected distance of 650 km) in p.a. 322°, detected in every image recorded over the 5.5-hr baseline. Careful analysis of the last set of data indicates the presence of a second satellite, smaller (∼ 3 km) and located closer to the primary at an apparent distance of 380 km (0′′42) in p.a. 333°. With (87) Sylvia (cf. IAUC 8582) and (45) Eugenia (cf. IAUC 8817), this is the third multiple system with two small-km-sized satellites to be discovered in the main asteroid belt.

COMET P/2008 R1 (GARRADD)

Improved, elliptical orbital elements for this comet (cf. IAUC 8969) from MPEC 2008-S46:

\[
\begin{aligned}
T &= 2008 \text{ July } 25 \text{. } 200 \text{ TT} \\
\omega &= 256°.436 \\
\epsilon &= 0.34203 \\
\Omega &= 52°.018 \\
q &= 1.79261 \text{ AU} \\
\theta &= 15.899 \\
a &= 2.72444 \text{ AU} \\
n^o &= 0.219174 \\
P &= 4.50 \text{ years}
\end{aligned}
\]

COMET 205P/Giacobini

MPEC 2008-S47 contains astrometry and ephemerides for components A, B, and C (cf. IAUC 8978), and also revised orbital elements (with non-gravitational parameters) satisfying the primary component during 1896–2008. Visual total-magnitude estimates for component A: Sept. 11.07 UT, 12.7 (J. J. Gonzalez, Palencia, Spain, 20-cm reflector); 16.96, 12.9 (M. Goiato, Araçatuba, Brazil, 22-cm reflector); 19.83, 12.2 (Gonzalez, Leon).