**Discovery of Companions to Asteroids 762 Pulcova and 90 Antiope by Direct Imaging**

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We present images of two asteroid companions from adaptive optics (AO) observations. These detections bring to four the number of binary systems ever imaged, the previous discoveries being 243 Ida/Dactyl by Galileo in 1993 (Belton *et al.* 1995, *Nature* **374**, 785) and 45 Eugenia/Petit-Prince in 1998 (Merline *et al.* 1999, *Nature* **401**, 565).

A satellite of 762 Pulcova was discovered on 2000 Feb 22 UT at the Canada-France-Hawaii Telescope (CFHT) and was later confirmed by additional observations at CFHT and Keck II. The satellite is about 4 mag fainter than the primary and our fit to the orbit indicates that it was inclined approximately 60 deg to the line-of-sight, with a semi-major axis of 800 km ($0.6''$) and a period of 4.0 days. We derive a density for this FC-type primary of $1.8\,\mathrm{g\,cm^{-3}}$, higher than our nominal value of $1.2\,\mathrm{g\,cm^{-3}}$ for F-type Eugenia.

On 2000 Aug 10 UT, Keck AO observations revealed that the C-type 90 Antiope is a double asteroid, with similar-sized components, separated by only 170 km ($0.12''$), with a brightness difference of less than 0.1 mag. The co-orbiting pair was observed on 6 consecutive nights and was found to have an orbital period of about 16.5 hours, consistent with the established photometric "rotation" period. While we cannot rule out a very thin bridge of material connecting the two, we show that it is not similar to the dumbbell-shaped 216 Kleopatra reported by Ostro *et al.* 2000 (*Science* **288**, 836). The two components are clearly separated in the raw images, with a contrast consistent with the PSF. We acquired similar images of Kleopatra before, during, and after the radar observations of Ostro *et al.* Our Kleopatra images show a bridge connecting the two components, but such a bridge is absent in our Antiope images.

This program is funded by NSF and NASA and uses CFHT (French time), Keck Observatory (NASA time), and Mt. Wilson Observatory.
Abstract submitted for AAS [] meeting DPS2000

Date submitted: Electronic form version 3.0 (21 June 2000)