Near Earth Asteroid 2003 UV11

Last October, Near Earth Asteroid 2003 UV11 passed within five lunar distances of Earth. Discovered in 1996, the object's orbit was found at that time to be highly eccentric. The object reaches perihelion inside the orbit of Mercury and aphelion between the orbits of Mars and Jupiter. Since it spends most of its time outside the orbit of Earth it is classified as an Apollo NEA. At various times during its two year revolution around the sun, it crosses the orbits of all four terrestrial planets. Our recent visitor is roughly 400 to 600 meters in diameter, fairly large for an NEA.

We used the telescopes at Indian Hill to observe the asteroid. CCD images were recorded on Oct 28 when it was still two days from closest approach and three million miles from Earth. At that time the object was in Pisces and moving across the sky at 28 arcsec/min. This sky motion was large enough to reveal a slight bulge in the 20 second exposures. But the object still required roughly 30 minutes to move across the 15 arcmin field of view of the CCD.

Two nights later, additional images captured the asteroid in Pegasus. By this time, our visitor was zipping along at 162 arcsec/min and crossed the same 15 arcmin field of view in just 5 minutes. Since we used two different telescopes and CCDs for these observations we cropped and rotated one of the images to match the orientation and field of view of the other. The change in sky motion is indicated by the length of "trails" made by the NEA in these images. During the two day interval between these images the position angle also changed remarkably.

The Minor Planet Center (MPC) classifies this NEA as "Potentially Hazardous". But there is no immediate concern. Unless the asteroid is perturbed by the other terrestrial planets, it will not approach Earth within one lunar distance for hundreds (if not thousands) of years. However, even slight changes in its orbit from gravitational interactions with our neighboring planets can accumulate quickly, which makes predicting its path with certainty into the near future quite impossible.

Using a small sample of our CCD images we determined accurate astrometric positions of the NEA. These measurements were submitted to the MPC using the Indian Hill Observatory Code [H75]. They are now part of a small database of observations from official MPC observatories, and will be used by the MPC to determine future sets of osculating orbital elements.

At 12th magnitude at closest approach (and large sky motion), this asteroid provided a very good opportunity for visual observation in moderate size telescopes. However, due to less than desirable sky conditions on the nights of our observations, we cannot confirm a visual sighting.

Visit the Scientific Activities page on our website to see animations of these CCD observations.

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