The Sizes of 1978 CA and 1978 DA

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While in the midst of making the reductions of the data obtained for 1978 CA and DA, it is hardly possible to give a coherent story about the physical parameters for these two km-size bodies. This short note gives a description of the observational work done with the instruments of the Lunar and Planetary Laboratory.

Jonathan Gradie obtained the first hour of observations at the 154 cm telescope in the Catalina Mountains on 7 March UT with the photopolarimeter MINIPOL (Frecker and Serkowski, 1976). With the polarization data no insight was yet possible into an albedo value, because the measurements were done close to the so-called inversion angle, the phase angle where the polarization vector changes from a negative orientation (in the plane of scattering) to a positive orientation (perpendicular to the plane of scattering).

The following night Marcia and Larry Lebofsky measured the flux of both objects at 10 microns with the 71 cm telescope on Mount Lemmon, while I worked several kilometres away with the 154 cm reflector and MINIPOL, obtaining a light curve in the Johnson colours *V* (Fig. 1) and *I*, together with polarization data for CA and *UBV* colours for both objects. By combining the 10 micron fluxes and *V* magnitudes it is possible, with a proper radiative model (Lebofsky *et al.*, 1978), to obtain albedos and mean diameters of 0.068 ± 0.006 and 1.86 ± 0.04 km for CA, and 0.17 ± 0.03 and 0.90 ± 0.05 km for DA. Both objects showed typical *S*-type *UBV* colours.

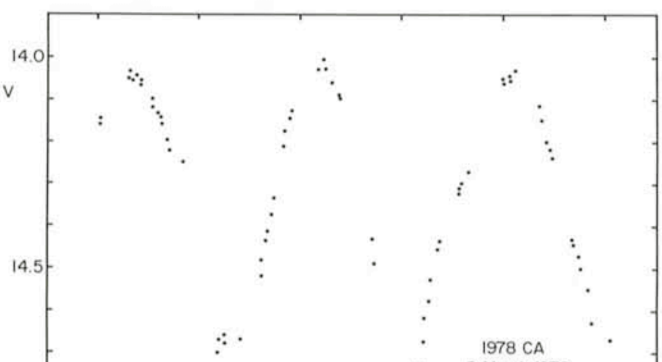

Fig. 1.

It was immediately clear that CA showed a very low albedo for an asteroid with reddish colours, and more polarization measurements were done during the third and fourth nights with the 154 cm telescope to confirm the radiometric albedo using the relation between polarization and phase angle. In addition, colours in the red part of the spectrum were measured to get a more detailed insight into its reflection spectrum.

By combining the pieces of light curves obtained during the four nights, we are able to derive a rotation period of $3^h 45^m 38^s \pm 3$ seconds. Figure 2 shows the total averaged light curve, but without the data points.

Recently Jean Surdej was kind enough to send us his data, and Ron Taylor will attempt to see whether it is possible to get an insight into the orientation of the pole and the sense of rotation.

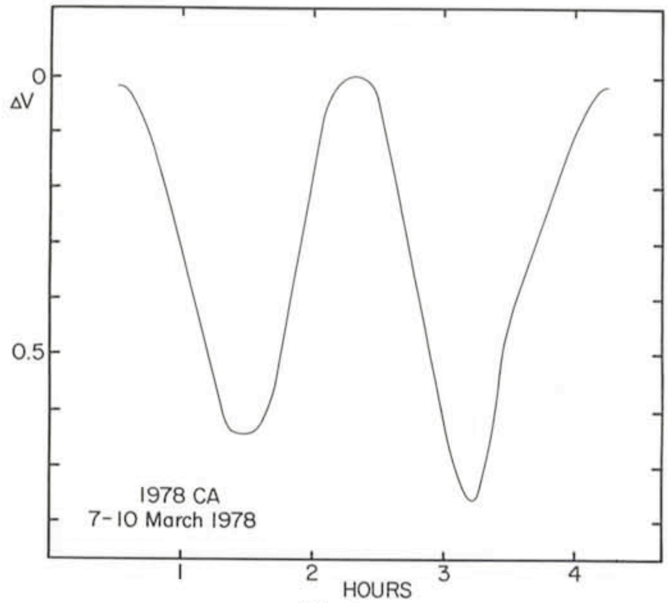

Fig. 2.

We also obtained a short stretch of light curve for 1978 DA (Fig. 3), but very little can be said about a rotation period.

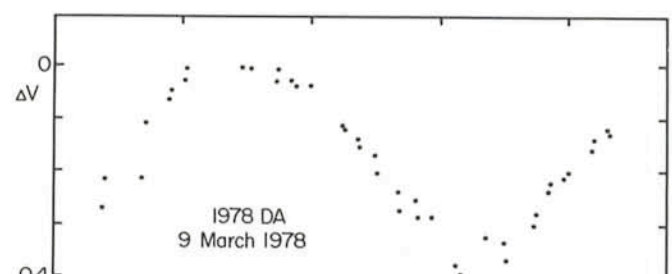

Fig. 3.

We are very happy with the existence of such an active group at ESO, observing the km-size bodies in the solar system. With fast communication, observers with suitable instruments may unravel the mysteries of the km-size bodies and their possible interrelation with cometary nuclei.

References

Frecker, J. E. and Serkowski, K. (1976). *Appl. Opt.* **15,** 605.

Lebofsky, L. A., Veeder, G. J., Lebofsky, M. J. and Matson, D. L. (1978). Accepted for publication in *Icarus.*