STARDUST Office
264-379
Jet Propulsion Laboratory
4800 Oak Grove Dr.
Pasadena, CA 91109

Dear Observer,

The STARDUST spacecraft will encounter Comet 81P/Wild 2 on January 2, 2004. The comet's solar elongation has been less than 30º since early May, making ground based observations essentially impossible. We are trying to put together a small group of observers who will make precise photometric or astrometric observations in the morning sky in mid to late December. Working at five airmasses or more is difficult at best and should be attempted only by people with a great deal of experience making quantitative observations so near the horizon.

The project is seeking R-band photometry using either a Johnson or Cousins filter and a well defined aperture, either a physical aperture in a photoelectric photometer or a well defined region of a CCD. Large telescopes are desirable, because they have sufficient scale to define a region of the comet not too much larger than say 10,000 km, a region where the coma brightness is still falling off nearly linearly with distance from the nucleus. Those attempting astrometry should be sure to give coordinates for the brightest pixel, not a centroid of the flux in an aperture. The latter always biases the coordinates to the sunward of the nucleus. This should be attempted only by those used to carrying out astrometric measurements at sub-arcsecond accuracy even near the horizon. Bad data are worse than no data at all.

We need the photometric data to determine the comet's level of activity at the time of encounter so we can decide how close to fly by the nucleus. R band photometry is about 98% the result of dust scattering sunlight in the coma, and it is the dust that we want to collect but also fear during our 6.1 km/s flythrough. The astrometry will improve the accuracy of our knowledge of the time of closest approach. We are approaching at a nearly constant phase angle, so the distance at which we fly past will be well determined, but the time of encounter, the along track component, is uncertain by about ± 9 minutes. This means we have to spread out the time during which we take the 72 images that will fill our memory. Any improvement will give us that many more good images, and improvement will come largely from measurements at a very different angle, say from Earth.

All photometric measurements should be sent in absolute units, Watts/m^2 or R-band magnitudes, so the values can be quickly converted to dust production rates by yours truly. I will be very busy with other STARDUST work, so there is no way I will have the time to try to reduce someone else's data taken by a system completely strange to me. The project and I will be most grateful for data properly reduced. Any suggestion

of poor data, and we will be forced to simply discard it. Astrometric data will be used by Bill Owen and Steve Chesley also here at JPL. Be sure you specify the time to the nearest second and the coordinate system you are using (FK5, J2000 or whatever). My email and FAX number are Ray.L.Newburn@jpl.nasa.gov and (818) 354-2319. Steve Chesley's email and FAX are Steven.R.Chesley@jpl.nasa.gov and (818) 354-9615. In order to integrate this data into our plans, it must be in our hands by Dec.29 for final course corrections on Dec. 30. The entire encounter will be done autonomously, since Earth will be about 20 light-minutes from the comet at that time. Data around the time of encounter, which is set for 11:20 PST on Jan. 2, will also be most welcome, so we can compare what is seen by STARDUST to what is seen from the ground.

Again my thanks and those of my colleagues for any help you can give us.

Ray L. Newburn, Jr.

Co-I and Leader, Imaging Science Team