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EVALUATING SOME COMPUTER ENHANCEMENT ALGORITHMS THAT IMPROVE THE VISIBILITY OF COMETARY MORPHOLOGY;

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The observed morphology of cometary comae is determined by ejection circumstances and the interaction of the ejected material with the local environment. Anisotropic emission can provide useful information on such things as orientation of the nucleus, location of active areas on the nucleus, and the formation of ion structure near the nucleus. However, discrete coma features are usually diffuse, of low amplitude, and superimposed on a steep intensity gradient radial to the nucleus. To improve the visibility of these features, a variety of digital enhancement algorithms have been employed with varying degrees of success. They usually produce some degree of spatial filtering, and are chosen to optimize visibility of certain detail. Since information in the image is altered, it is important to understand the effects of parameter selection and processing artifacts can have on subsequent interpretation. Using the criteria that the ideal algorithm must enhance low contrast features while not introducing misleading artifacts (or features that cannot be seen in the stretched, unprocessed image), we assess the suitability of various algorithms that aid cometary studies of. The strong and weak points of each are identified in the context of maintaining positional integrity of features at the expense of photometric information.

The simplest operation is to alter the intensity scale by some non-linear relation (such as the base 10 logarithm) that suppresses the steep intensity peak near the photocenter. This helps bring the brightness of the faint outer regions of the coma closer to those in the inner coma. No artifacts are introduced, but there is only a modest improvement in visibility of low contrast features.

Spatial derivative, or "shift-difference" algorithms enhance intensity discontinuities, but only in the direction of the shift. The simple linear shift-difference is very effective for bringing out ion tail structure when the shift is perpendicular to the tail axis. The degree of shift is a compromise between showing the smallest detail and enhancing the noise. The most serious problems with this method is that the results are directionally dependent, and are not easily interpretable. The resulting features, showing the rate of change of intensity, locate the edges of jets and shells. The radial plus rotational (with respect to the photocenter) shift difference algorithm reduces the directional dependency, but still requires care in interpretation since it enhances the edges of features. Finding the best combination of rotational and radial shifts can be difficult and enhances only a limited spatial frequency range.

Temporal derivative images are projected velocity maps that (among other things) make it easy to distinguish rapidly varying ion features from the slower moving dust structures. Successful short-term difference images bring out ion features which are normally a minor component of a broad-band image. This method places great demands upon sets of images with nearly identical quality and very precise registration. Variations in seeing and guiding can complicate the result. This method will be particularly useful in extracting ion features in the consistent quality images produced by the Hubble Space Telescope. Interpretation must be made with care, since the result is an image of moving feature edges.

Azimuthal function algorithms reduce the radial gradient by either subtracting the average value in the annulus of constant distance from the photocenter, or by subtracting a best-fit, low-order function to the annulus. Averaging and function fitting is more easily done after a polar to rectangular coordinate transformation (with the photocenter at the origin). This method is very efficient in eliminating the radial gradient, does not have any directional dependencies, and interpretation is straight-forward. The photocenter must be determined very carefully, especially for undersampled data, or spurious features close to the nucleus may be produced.

Traditional spatial filtering algorithms reduce the radial gradient by eliminating the low spatial frequency domain in the image. A "high-pass" gaussian deconvolution retains features in the image smaller than the gaussian, and by eliminating the broad radial gradient, the contrast of the smaller features can be increased. There is no directional dependency, but "ringing" artifacts can be seen around stars and the central condensation of the comet. Selecting the optimum size gaussian usually depends upon the characteristic size of the features of interest.

Since cometary features typically become larger farther from the nucleus, spatially selective spatial filtering might be desirable. One method is to subtract a synthetic image based on a generalized model of particle outflow. This assumes some *a priori* knowledge of the ejection function. A simple isotropic r^{-1} distribution might work well for a rapidly rotating nucleus, but not for a slow rotator emitting on the illuminated hemisphere. If there is enough data, subtraction of a mask produced by the median of many images over time.may also work (note that this is similar to a temporal derivative). We have recently developed a variable kernel deconvolution routine that passes increasingly higher frequencies closer to the photocenter. This enhances a larger spatial range of coma features which often exist in an image.

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HELIOCENTRIC DISTANCE DEPENDENCIES OF THE C_2 LIFETIME AND C_2 PARENT PRODUCTION RATE IN COMET P/BRORSEN-METCALF (1989o);

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Comet p/Brorsen-Metcalf (1989o) has been spectroscopically observed during July and August 1989 when its heliocentric distance ranged from 1.1 to 0.65 AU. From long-slit spectra covering the 4000–7000 Å region, brightness profiles for the C_2 Swan bands $\Delta v = +1, 0, -1$ have been obtained. This large data set allows both the determination of the lifetimes of the C_2 radical and its parent and the study of their evolution with heliocentric distance, Rh.

The data were analyzed assuming a parent molecule velocity varying as 0.85 $R_h^{-0.5}$ km s^{-1}. The C_2 lifetime was found to vary as R_h^2, wich is consistent with the fact that its main production path is a single photodissociation of a parent molecule. The production of the C_2 radical and its parent molecule were found to vary as R_h^4 in agreement with the water production rate variation derived from IUE observations.

EVOLUTION OF COMETARY DUST : SOME CLUES DERIVED FROM POLARIMETRIC OBSERVATIONS OF LEVY 1990 c AND OTHER COMETS

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Numerous measurements of normalized intensity and polarization of solar light scattered by comet Halley dust particles have been performed during the 1985/1986 return, in the 0° to 73° phase angle (α) range. Compilations of the data already published or transferred to IHW archives are available (1). Typically, the polarization was found to be negative (direction of polarization in the scattering plane) at small phase angles, to change sign for $\alpha = (21 \pm 1)°$ and to increase almost linearly (0.3 % per degree near $\lambda = 500$ nm).

Recent accurate polarimetric cometary observations (e.g. Austin 1989 c_1, Levy 1990 c) allow us to derive synthetic polarization curves. No significant differences are found between old periodic comets and new comets near the inversion point (where the polarization changes sign). However a significant spreading of the data is detected i) for small apertures observations and ii) at large phase angles.

The analysis of the polarimetric maps (2) we derived from observations performed in August 1990 at Pic du Midi Observatory (2 m telescope + CCD 510 x 320) suggests that the former result can be interpreted in terms of jet activity in the inner coma. The comparison between the polarimetric properties of comets and those of interplanetary dust grains (3, 4), which depend upon their solar distance and the inclination of their orbit upon the ecliptic, suggests that the latter result can be interpreted in terms of evolution of the optical properties of the cometary dust with surface temperature and ageing of the cometary nucleus.

References :
(1) Dollfus A, Bastien P, Le Borgne J.F., Levasseur-Regourd A.C. and Mukai T., 1988, Astron. Astrophys., 206, 348-356.
(2) Renard J.B., Levasseur-Regourd A.C. and Dollfus A., 1991, Ann. Geophys., Vol. 9, Supp., C385.
(3) Levasseur-Regourd A.C., Dumont R and Renard J.B., 1990, Icarus, 86, 264-272.
(4) Levasseur-Regourd A.C., Renard J.B. and Dumont R., 1991, in "Origin and evolution of interplanetary dust", Kluwer, 131-138.

The LONG–TERM DYNAMICAL BEHAVIOR OF SMALL BODIES IN THE KUIPER BELT

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Recent numerical calculations [1, 2] have shown that short-period comets, which are on low inclination orbits, cannot originate from the gravitational scatter of long-period comets. Work by Duncan, Quinn, & Tremaine [1] shows that objects originally on low inclination, Neptune-crossing orbits will evolve into a population of objects with orbital parameters consistent with those of short-period comets. However, they point out that the timescale to deplete this initial population of planet-crossing objects is short. Therefore, they conclude, that there must be a system of objects that are evolving into planet-crossers on the timescale of the age of the solar system. The most likely source of these objects is a region just beyond the orbit of Neptune, the *Kuiper belt*.

In order to complete this theory, it is still necessary to show that objects that formed in the Kuiper belt can become Neptune-crossers and to determine the timescale for this process. For if the length of time to deplete the Kuiper belt is too short, then it can no longer be the source for the short-period comets seen today. If the length of time is too long, then it will be difficult to reproduce a large enough flux of new comets to explain the number of observed short-period comets. Unfortunately, because the timescales involved must be on the order of the age of the solar system, it is not possible to determine them through the use of direct numerical integration of orbits with current computer technology. In this paper we calculate the timescales of the evolution of objects in the Kuiper belt using a new technique that treats the evolution of orbits in integral space as a diffusion problem.

The details of our results depend on what region of the solar system is studied. Here we define the Kuiper belt as the region of integral space such that $q \geq 30AU$ and $a \leq 100AU$. Objects tend to diffuse through this region on timescales that are on the order of the age of the solar system. These diffusion times imply that it is very unlikely to find an object near to where it formed. The diffusion process can be viewed as a random-walk where the q and a slowly change as a function of time. Surprisingly, the tendency is for objects to diffuse outward in the solar system. Although this trend is significant, objects are free to migrate in either direction.

A large fraction of integral space is covered with orbits whose lifetimes are on the order of the age of the solar system. Here, *lifetime* is defined as the statistically mean length of time it takes for an object to evolve out of the Kuiper belt ($q < 30AU$ or $a > 100AU$). For a large fraction of integral space ($Q \lesssim 100AU$), the expected lifetime of an object is approximately dependent only on its initial perihelion distance. The region of the Kuiper belt where objects formed and are still present in the Kuiper belt has an inner edge at approximately $45AU$. Although it is possible to find such a region, the objects that formed there have most likely evolved to fill the entire Kuiper belt because the diffusion rates are significant. The longest mean expected time for an object to remain in the Kuiper belt is 1.8×10^{10} years. It occurs for an object that formed in circular orbit at $a = 75AU$. Approximately 30% of these objects become Neptune-crossers and thus provide a source for short-period comets. The rest are stored in orbits further out in the solar-system.

Even objects that form close to the orbit of Neptune have a significant chance to evolve to orbits with $a > 100AU$. For example, objects that formed in circular orbits at $45AU$ have a 50% chance of evolving to orbits with $a > 100AU$. However, objects stored in this region of the solar system are not precluded from becoming short-period comets. It is possible that after being stored for some time that they can diffuse back through the system to become Neptune-crossers. Indeed, a significant fraction of objects follow this evolutionary track. They formed near the orbit of Neptune and slowly evolved to orbits with $a > 100AU$. After being stored there for some time (say approximately 5×10^9 years), they can diffuse back through the Kupier belt and become Neptune-crossers. Thus, a significant fraction of objects that formed near the orbit of Neptune can currently be evolving into short-period comets.

Determining these timescales was the last remaining hurdle in the development of a complete theory of the formation of short-period comets. Our work shows that the timescales for objects leaving the Kuiper belt are consistent with it being the source for short-period comets.

References:

[1] Duncan, M., Quinn, T.,& Tremaine, S. (1988). *Ap.J. Lett.* **328**, L69.
[2] Joss, P.C. (1973). *Astron. Astrophy.* **25**, 271.

MAPPING THE STABILITY FIELD OF TROJAN ORBITS IN THE OUTER SOLAR SYSTEM.

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Trojan orbits are stable or quasistable orbits that librate about the 1 : 1 resonance with the mean motion about the Sun of their co-orbital planet. Objects currently found on these orbits are remnants of solar system planetesimals. Studying these objects may provide important insights into the physical conditions that existed in the region near their co-orbital planet at the time of planetary formation, provided the dynamical history of these objects can be understood. The only outer planet with an observed ensemble of Trojan asteroids is Jupiter. Trojans associated with the other giant planets, if they do indeed exist, have yet to be discovered. In order to determine whether these objects should theoretically exist, we have undertaken to map the stability field of Trojans about Jupiter, Saturn, and Neptune in terms of the variables proper eccentricity, e_p, and libration amplitude, D. In the case of Jupiter, this mapping is intended to aid in our understanding of the dynamical evolution of the observed Trojan swarms. For Saturn and Neptune, it was carried out to determine if the Trojans should be present and, if so, where they can be found.

To accomplish the mapping for a particular planet, we integrated numerically the orbits of 110 particles with e_p in the range 0 to 0.8 and D in the range 0° to 140°. Orbits of the Sun and the four Jovian planets were integrated as a full N-body system, in a barycentric frame. The orbits of the test particles were calculated under the gravitational influence of these 5 bodies, but were not self-gravitating. The equations of motion for all the objects were integrated using a fourth order symplectic scheme [1, 2]. Test particles were started with orbits in the orbital plane of the planet being studied. We did perform a preliminary series of integrations of Jupiter Trojans carried out to 178 000 years, where the initial inclination of the orbits was 10°, we found no significant difference in the limit of the stability field from that obtained with $i = 0$. Test particles were considered to be on Trojan orbits until they either experienced a close approach with their co-orbital planet, or visited all four quadrants of a coordinate system moving with the co-orbital planet.

We first discuss the results for Jupiter. In a preliminary study of highly eccentric orbits we found that the longitude of the libration point is not fixed at $\pm 60°$ from the mean longitude of Jupiter but is a function of e_p and can be as large as 110° for orbits with $e_p = 0.8$. Initially the stability field is quite large. After only 18 000 years it contains orbits with D as large as 110° and orbits with e_p as large as 0.7. With increasing time, however, the stability field shrinks in both e_p and D. At the end of our $18 Myr$ integration, the stability field did not contain any orbit with $D \gtrsim 90°$ or $e_p \gtrsim 0.25$. It is important to note that this is much larger than that limit of the main field of observed Jupiter Trojans ($D \lesssim 70°$, $e_p \lesssim 0.15$). Thus, we think that if we continued our integrations, the stability field would continue to shrink and that the current limit of the main field of observed Jupiter Trojans probably represents the approximate limit of stability for a time interval of 4.5 billion years. One recently discovered Jupiter Trojan, 1989 BQ, lies well outside the main Trojan field ($e_p = 0.22$, $D = 17°$) and is close to our stability limit at $18 Myr$. We suggest that the dynamical lifetime of 1989 BQ may be of order 10^8 years and that it has been captured late in solar system history.

Mapping of Saturn Trojan orbits shows that both small and large libration amplitude orbits are unstable on very short timescales. After only 30 000 years all orbits with $D \lesssim 40°$, $D \gtrsim 95°$, or $e_p \gtrsim 0.1$ have disappeared. Again, with increasing time the stability field shrinks in both e_p and D. After $30 Myr$ the stability field is quite small, containing only orbits with $50° \lesssim D \lesssim 80°$ and $e_p \lesssim 0.06$. It has been suggested that these orbits may be long-lived because their libration periods are close to a commensurability with the period of the *great inequality* between Jupiter and Saturn [3]. At the end of our integration, the limit of stability was still shrinking. We think that it is unlikely that any Saturn Trojan orbit will be stable for the age of the solar system.

A preliminary study of Neptune Trojan orbits shows that orbits with small libration amplitudes, $D \lesssim 35°$, do not exist. Any particle placed initially in an orbit with a semi-major axis the same as Neptune will begin to librate independent of its initial longitude or its initial velocity with respect to Neptune. After $3 Myr$, the mapping shows a stability field containing only orbits with $35° \lesssim D \lesssim 85°$ and $e_p \lesssim 0.1$. As was the case with Saturn, the limit of stability was still shrinking at the end of the integration. Since the region of stability is so small after $3 Myr$, we think that all the Neptune Trojan orbits will be unstable after 4.5 billion years.

References:

[1] Gladman, B., and Duncan, M., 1990, *Astron. Jour.*, **100**, p. 1680–1693.
[2] Gladman, B., Duncan, M., and Candy, J., 1991, To appear in *Celest. Mech.*
[3] Innanen, K.A., and Mikkola, S., 1989, *Astron. Jour.*, **97**, p. 900–908.

Numerical Simulations of Cometary Gas and Dust

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Most observations of comets are done photometrically or spectrophotometrically. The interpretation of the aperature–averaged flux is relatively simple for an isotropic, radially expanding coma. However, the interpretation of the observations is not so clear when the the motion of the gas and dust is affected by radiation pressure, or when the emission is time–varying and anisotropic. Additionally, both the gas and dust have problems specific to themselves: the gas is created and destroyed via photo–processes, with non–radial velocities imparted to the photo–products, and the dust is characterized by a size distribution, with size dependencies on the expansion velocity, the scattered and thermal radiation, the response to radiation pressure, and probably the density. How good then are the approximations normally used in determining the production rates of the gas and dust when these effects are present?

As part of a program to better understand the dynamics of cometary dust and gas, a computer program has been developed which numerically simulates the emission of both dust and gas from the nucleus of a tilted rotating nucleus. The gas coma simulation includes the effects of the lifetime of the parent and daughter products, non–radial velocities upon dissociation, and radiation pressure. The dust coma simulation includes the effects of the size dependencies on the expansion velocity, and scattering or thermal emissivity (based on either approximations or Mie theory calculations using measured optical constants) and on the response to radiation pressure. Anisotropic emission is approximated by a gaussian jet centered at any latitude and longitude on a rotating nucleus of arbitrary rotation rate and obliquity.

The "image" of the gas or dust coma can be generated, as well as aperture– or annulus–averaged fluxes. An example of the annulus–averaged flux is presented below for P/Halley on 15 March 1986. Figure 1 shows isotropic dust emission for 14 days at $v = 0.05\,km/s$ with $\beta = 0$ along with the analytical result for the same input parameters. In Figure 2, the effects of a distribution of sizes (approximated here by a distribution in β which is rectangular in $\log(\beta)$ on the interval $[-4, -2]$, and where the scattered radiation is $\propto \beta^{-2}$ and the expansion velocities are in the range $[0.016, 0.16]\,km/s$). Clearly, the assumption of isotropic expansion is not justified. Aperture photometry would show a decrease in flux as the aperture increases.

A series of models will be presented which show the effects of radiation pressure, anisotropic emission, and rotation on the aperture– and annulus–averaged fluxes. These models will be analyzed by assuming isotropic, radial expansion to determine production rates, and compared with the production rates used in the simulations.

Figure 1

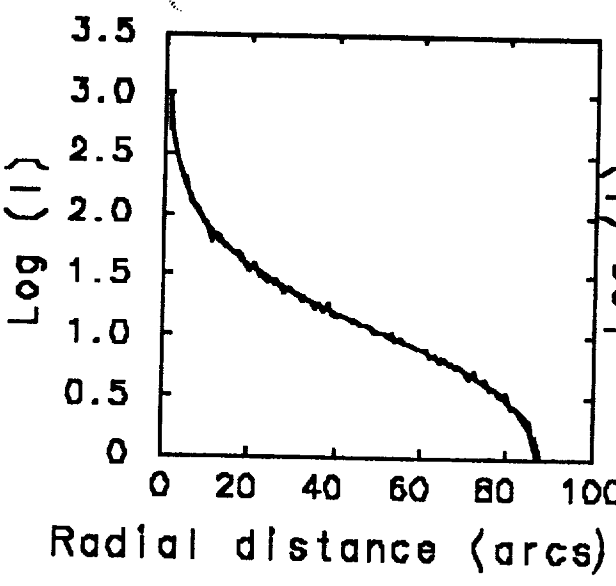
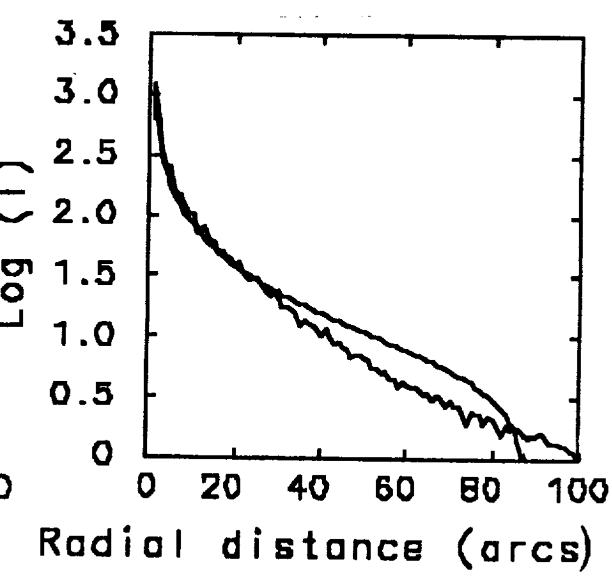


Figure 2



A COMPUTER SEARCH FOR ASTEROID FAMILIES;

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Various problems in the identification of asteroid families on the basis of the proper elements are discussed. Previous work in this area is briefly reviewed. Lindblad and Southworth (1971) proposed the use of the D-criterion for mathematically defining a clustering in three dimensional *a*, *e*, *i* proper element space. It was shown that, once the rejection level was defined, this method easily sorted out all the known families with practically the same membership as in previous studies by Hirayama and Brouwer.

Some twenty years has now ellapsed since the first study. The available data sample of numered asteroids has increased from 1697 to 4100, and new methods of computing the proper elements have been developed. A tape with improved proper elements of 4100 numbered asteroids was announced at the ACM III meeting in Uppsala (1989) by Milani and Knezevič. It has recently been distributed to a number of scientists. In view of these improvements in the data base the author has found it appropriate to make a new study of the asteroid families. The study is based on the same selection criteria as in the previous study.

ACTIVITY AND ORBIT OF THE LYRID METEOR STREAM;

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The activity of the Lyrid meteor stream is in most years fairly low with a reported visual rate at maximum (21-22 April) of 5-10 meteors per hour. Short bursts of very high Lyrid activity, with visual hourly rates of 100 or more, have sometimes been reported. These observations generally refer to faint visual meteors. We find that the reported bursts of high activity have occurred at solar longitudes 31°.2 to 31°.4 (equinox 1950.0), while the recurrent or "normal" maximum for bright (visual and photographic) meteors occurs at solar longitudes 31°.5 to 31°.9. A mass separation of the meteors in the shower is thus indicated.

A precise determination of the mean Lyrid orbit is made based on 12 orbits photographed in the period 1941-85. The mean photographic orbit is compared with the orbit determined from Harvard radio data and with that of P/Comet Thatcher (1861 I). The present Lyrid orbit is almost identical to that of the parent comet. An interesting feature of the photographic Lyrids is the extremely small scatter around the mean orbit; the stand. dev. in the angular orbital elements being of the order of 1°.

Dynamical timescales in the Jupiter family

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The dynamical lifetime of the comets in the Jupiter family have not yet been determined very accurately. And since the model for the apparent steady–state of this population basically consists of a balance between the dynamical infeed of comets from some source population, and a combination of dynamical and physical loss, one of the parameters we need to know is how long a comet on average spends in the Jupiter family. The calculation of this lifetime is not a trivial one, since we in this case are dealing with dynamics that include close encounters with Jupiter, and hence very large perturbations with corresponding "jumps" between orbits belonging to the Jupiter family and other orbits. The actual calculation of the dynamical lifetime then consists of adding, in some cases several, separate periods of time between returns and ejections into and out of the Jupiter family.

The method chosen for this investigation consists of a statistical analysis of the orbital evolution over 50000 years of a large number of fictitious cometary orbits evenly distributed in the Jupiter–Saturn region. The dynamical model used is the system: Sun–Jupiter–Comet with Jupiter in its present orbit.

COBE/Diffuse Infrared Background Experiment (DIRBE) Observations of Comet Austin (1989c1) , Comet Levy (1990c), and Comet Okazaki-Levy-Rudenko (1989r)

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The Diffuse Infrared Background Experiment on the Cosmic Background Explorer (COBE*) observed Comets Austin, Levy, and Okazaki-Levy-Rudenko during its 10 months of cryogenic operations. The DIRBE is a 0.7^{o} FOV, superfluid-helium cooled, ten band absolute photometer covering the wavelength range 1-300 µm, that surveys half the sky each day in a helical scan pattern covering 64 -124^{o} elongation from the sun. DIRBE detected thermal emission from dust in the tails of these comets at 12 and 25 µm with high contrast against the sky background; detection at other wavelengths depended on the comet's activity and viewing geometry. Each comet is scanned at least once every 103-minute orbit while in the DIRBE viewing swath, over a period of weeks. Single comet scans are used to investigate the spatial spectral profile, and multiple comet scans are used to build a single-band image on the timescale of a day. We present our latest images, spectra, temporal trends, and interpretations of the DIRBE comet observations.

*COBE is supported by NASA's Astrophysics Division. Goddard Space Flight Center (GSFC), under the scientific guidance of the COBE Science Working Group, is responsible for the development and operation of COBE.

COSMOGONIC ASPECTS OF ASTEROID ROTATION.

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The available data on asteroid rotation rates, sense of rotation and orientation of asteroid axes in space are analysed from the point of view of asteroid rotation origin and its connection with cosmogonic processes in asteroid belt. These data show that observable rotation and shape of overwhelming majority of asteroids were acquired by them in process of collisional evolution. At the same time the rotation of largest asteroids is primordial one, acquired in process of accumulation and following the collisional evolution did not change it considerably. And as primordial rotation of asteroids is preferentially prograde, it may be considered as observable argument in favour of accretion process of their origin.

Rotation peculiarities and shape of M-type asteroids are in agreement with higher strength (that is density) of their matter. V-like dependence of a part of asteroids with retrograde rotation versus asteroid diameters has been revealed, which has minimum near D=125 km (similar to dependences of rotation rates and lightcurve amplitudes on diameter). It is shown that there is a rather considerable unisotropy of distribution of asteroid axis orientation in space. There is no doubt that the explanation of the nature of "cosmogonic diameter" (D=125 km) phenomenon and other observable effects will provide the important information on the processes of dynamical evolution in asteroid belt.