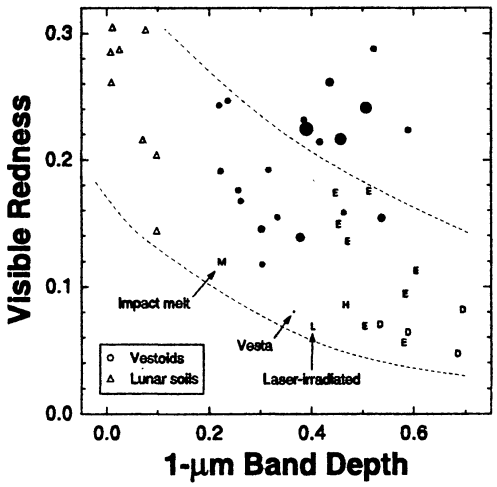
interpretation of these objects as all being fragments of iron-nickel cores. Similarly, observations of hydrated E-class asteroids at 3 μm by Rivkin *et al.* (1995) call into question the association between this asteroid class and the igneous, anhydrous aubrite meteorites (Bell *et al.* 1989).

Further observations of M asteroids undertaken through 1996 give a total of 26 M-class asteroids observed, with 10 of these bodies showing a water of hydration absorption. These data show a size dependence with regards to hydration state of M-class asteroids. The only M-class asteroid surveyed larger than 200 km was 16 Psyche, which is anhydrous. In the 65–200 km diameter size range, 12 asteroids were observed, of which 8 are hydrated, and 3 are anhydrous. In the smallest size range (0–65 km), 13 asteroids were surveyed of which 2 were hydrated, 10 are anhydrous. The remaining two asteroids are of uncertain hydration state.

Although the E asteroids are much less common than M asteroids, and consequently only six of these elusive asteroids were observed, a similar trend is recognizable. Four of the six E-class asteroids are observed to have a 3-μm water-of-hydration feature, while two are anhydrous. The two anhydrous E asteroids are the two smallest asteroids in the group observed.

We will present spectra of these asteroids and discuss the implications of these data with regards to their composition and thermal history.

References: [1] Binzel R. P. and Xu S. (1993) Science 260, 186. [2] Hiroi T. *et al.* (1995) Icarus 115, 374. [3] Wasson J. T. *et al.* (1997) Lunar Planet. Sci. 28, 1505. [4] Hiroi T. (1997) Antarct. Meteorites 22.



07.08

The Silicate Chemistry of the A-type Asteroids

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Previously obtained high quality near-infrared spectra of asteroids revealed that a class of objects, the A-types, have spectra which are quite similar to the mineral olivine. We compared the spectra of asteroids 446 Aeternitas, 289 Nenettta, 246 Asporina, and 863 Benkoela with a series of powdered laboratory olivines of varying Fe content. We conclude that the 1.05 micron olivine feature in all four asteroids is identical to the same feature in very Fe-poor laboratory olivines. The presence of very low Fe olivine indicates that the objects' origin lies in a reduced parent body, unlike most common meteorite types. The only meteorite type with a monomineralic olivine silicate fraction and this unusual Fe-poor olivine chemistry is the main group of pallasites. Thus it seems likely that the well-known A-type asteroids are the parent bodies of the main group of pallasite meteorites, and are not metal-free olivine assemblages.

07.09

Origin of Vestoids Suggested from Their Space Weathering Trend

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A space-weathering-related trend of 20 Vestoids [1] was studied using HED meteorites [2], laser-irradiated diogenite [3], eucrite impact melt [4], and lunar soils based on the following parameters:

1-μm band depth = lnR_M - lnR_C, Visible redness = lnR_M - lnR_{55},

where R_M, R_C, and R_{55} indicate reflectance at the maximum around 0.74 μm, the 1-μm band center, and 0.55 μm, respectively. The relation between these two parameters is shown in Fig. 1. Vestoids are shown with circles with a size proportional to estimated ejection velocity from Vesta [1].

There is a trend formed by HEDs, majority of Vestoids, and lunar soils. About 8 Vestoids diverge from this trend. These Vestoids do not belong to Vesta family with one exception. Furthermore, the three Vestoids with the largest ejection velocity all fall in this unusual group. The data indicate that many of the Vestoids far from Vesta's orbit are dynamically and spectrally distinct from the others. Perhaps they are more associated with the projectile.

Laboratory spectra were measured at RELAB, a multiuser facility operated under NAGW-748.

07.10

Occultation of GSC 23450183 by (704) Interamnia on 1996 December 17

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The sixth largest of the known asteroids, (704) Interamnia, was observed to occult GSC 23450183 (from the HST Guide Star Catalog) by 10 teams of observers. The chords cover the southern 60% of the profile of the asteroid. Our occultation results indicate a best fit circular profile with a radius of 164.6 km which is very close to the IRAS diameter. The residuals in the fit are generally less than 10 km but some are clearly due to topography on the object. The prediction for the event came from transit telescope measurements which indicated a formal 1-σ uncertainty of 94 km. The actual track was 233 km from the prediction for a 2.5-σ deviation. The lack of coverage on the north end of the object was caused by a concentration of stations more to the south based on the transit predictions.

We redetermined the rotation period of 8.70 $\pm$ 0.06 hours from the data of Lustig and Hahn (1976). From our additional lightcurve observations just before the occultation, we find that $H_V(\alpha)$ = 6.758 and the aspect was near a broad secondary minimum in the lightcurve. At the time of the occultation, the solar phase angle was 11 degrees and the lightcurve amplitude was 4%. The lightcurve also clearly shows a tertiary maximum 0.15 rotations earlier than the occultation aspect. This lightcurve structure supports the presence of topography on the object as seen in the limb fit to the occultation chords.

07.11

Vesta: Impact Crater Topography from Hubble Space Telescope WFPC2 Images

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Hubble Space Telescope WFPC2 images obtained in May 1996 at scales of 36 km/pixel have provided new topographic information on Vesta, the probable parent body for the HED (basaltic achondrite) meteorites. The most significant topographic feature is a 450 km diameter crater centered near the south pole, containing a large central peak. The placement of the crater and the low phase angle of observations (5°) allow limb coordinate measurements of the crater's morphologic characteristics. It is about 8 km deep, its