Issue No. 14 *November 2000*

DISTANT EKOs

The Kuiper Belt Electronic Newsletter

Edited by: Joel Wm. Parker

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CONTENTS

NEWS & ANNOUNCEMENTS

Objects with recently assigned numbers/names: 1994 JQ1 (16684)

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There were 42 new TNO discoveries announced since the previous issue of the *Distant EKOs* Newsletter:

2000 PA30, 2000 PB30, 2000 PC30, 2000 PD30, 2000 PE30, 2000 PF30, 2000 PG30, 2000 PH30, 2000 PJ30, 2000 PK30, 2000 PL30, 2000 PM30, 2000 PN30, 2000 PU29, 2000 PV29, 2000 PW29, 2000 PX29, 2000 PY29, 2000 PZ29, 2000 QB226, 2000 QC226, 2000 QD226, 2000 QE226, 2000 QF226, 2000 QG226, 2000 QH226, 2000 QJ226, 2000 QL226, 2000 AB255, 2000 AC255, 2000 AD255, 2000 AE255, 2000 AF255, 2000 PQ30, 2000 PR30, 2000 OH67, 2000 OJ67, 2000 OK67, 2000 OL67, 2000 OM67, 2000 ON67, 2000 QA243

and 6 new Centaur/SDO discoveries:

2000 QK226, 2000 PS30, 2000 QB243, 2000 QC243, 2000 OO67, 2000 OP67

and 2 reclassified objects:

2000 OY51 (SDO → TNO),
2000 PF30 (TNO → SDO)

Current number of TNOs: 329 (and Pluto & Charon)
Current number of Centaurs/SDOs: 55

EDITORIALS & SHORT ARTICLES

Starting with this issue, I will be including a new section: "Other Papers of Interest". The intention is to make note of papers that, though not *directly* related to the Kuiper belt/Centaurs/Pluto, may be of interest the readers of this Newsletter. When I started *Distant EKOs*, I explicitly wanted to avoid getting too far off topic, since my goal was to provide a focused resource for Kuiper belt studies. Now that this seems to be reasonably well established, I think it would be appropriate to encourage some cross-communication. Only the titles, author list, publication info, and contact/reprint links will be included for these other papers.

I would be interested in any feedback from readers regarding the editorial policy to include full abstracts only for accepted papers, and not include abstracts for submitted but not yet accepted papers, conference papers, other papers of interest, etc. Let me know if you would like to have full abstracts for all or some of those submissions (thus increasing length of each issue), or if you prefer the current format.

PAPERS ACCEPTED TO JOURNALS

The Effect on the Edgeworth-Kuiper Belt of a Large Distant Tenth Planet

S. Collander-Brown[1], M. Maran[2], and I.P. Williams[2]

[1] Department of Pure and Applied Physics, Queen's University, Belfast BT7 1NN, UK

[2] Astronomy Unit, Queen Mary and Westfield College, Mile End Road, London E1 4NS, UK

We investigate the orbital evolution of both real and hypothetical Edgeworth-Kuiper Objects in order to determine whether any conclusions can be drawn regarding the existence, or otherwise, of the tenth planet postulated by Murray (1999). We find no qualitative difference in the orbital evolution, and so conclude that the hypothetical planet has been placed on an orbit at such a large heliocentric distance that no evidence for the existence, or non-existence, can be found from a study of the known Edgeworth-Kuiper Objects.

Published in: Monthly Notices of the Royal Astronomical Society, 318, 101

For preprints, contact `s.c.brown@qub.ac.uk`

or on the web at `http://www.blackwell-synergy.com/Journals/toc.asp?IssueID=3649`

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Sweeping Secular Resonances in the Kuiper Belt Caused by Depletion of the Solar Nebula

Makiko Nagasawa[1] and Shigeru Ida[1]

[1]Department of Earth and Planetary Sciences, Tokyo Institute of Technology, Meguro-ku Tokyo 152-8551, Japan

We have investigated excitations of orbital eccentricities and inclinations of Kuiper Belt objects (KBOs) caused by the sweeping secular resonances during the primitive solar nebula depletion. Since nebula gravitational potential rotates the longitudes of perihelia and the ascending node, the nebula depletion leads to migration of secular resonances. In the outer (classical) Kuiper belt (the region beyond 42 AU), inclinations and eccentricities are respectively distributed up to 0.6 (radian) and 0.2, and their root mean squares are about 0.2 (radian) and 0.1. These large values are not explained by present planetary perturbations alone. We have investigated the sweeping secular resonances in the Kuiper belt with both direct orbital integration and analytical method and found that the sweeping secular resonances can account for the eccentricity and inclination in the outer belt. Inclinations of objects in the outer belt are excited to the observational level if the residual nebula with about 0.1% of the density in the minimum mass nebula model is depleted in a timescale of $10^7 - 10^8$ years. For inclination excitation, Jovian perturbations and nebula potential is the most important and Neptunian perturbations do not play an important role during the residual nebula depletion, although Neptune with more than 1/5 of present mass is needed for enough eccentricity excitation. If further observation of the KBOs at semimajor axis $\gtrsim$50AU confirms our model, it would give important clues about Neptune formation and the depletion of solar nebula.

To appear in: The Astronomical Journal

For preprints, contact `nagasawa@geo.titech.ac.jp`

or on the web at

`http://www.geo.titech.ac.jp/nakazawalab/nagasawa/mypaper/nandi2000.html`

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Gravitational Stirring in Planetary Debris Disks

Scott J. Kenyon[1] and Benjamin C. Bromley[2]

[1] Smithsonian Astrophysical Observatory, 60 Garden Street, Cambridge, MA 02138, USA

[2] Department of Physics, University of Utah, 201 JFB, Salt Lake City, UT 84112, USA

We describe gravitational stirring models of planetary debris disks using a new multi-annulus planetesimal evolution code. The current code includes gravitational stirring and dynamical friction; future studies will include coagulation, fragmentation, Poynting-Robertson drag, and other physical processes. We use the results of our calculations to investigate the physical conditions required for small bodies in a planetesimal disk to reach the shattering velocity and begin a collisional cascade. Our results demonstrate that disks composed primarily of bodies with a single size will not undergo a collisional cascade which produces small dust grains at 30–150 AU on timescales of 1 Gyr or smaller. Disks with a size distribution of bodies reach conditions necessary for a collisional cascade in 10 Myr to 1 Gyr if the disk is at least as massive as a minimum mass solar nebula and if the disk contains objects with radii of 500 km or larger. The estimated $\sim$ 500 Myr survival time for these disks is close to the median age of $\sim$ 400 Myr derived for nearby stars with dusty disks.

To appear in: The Astronomical Journal (2001 January)

For preprints, contact `skenyon@cfa.harvard.edu`

or on the web at `http://xxx.arXiv.org/abs/astro-ph/0009185`

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A Detection Method for Small Kuiper Belt Objects: The Search for Stellar Occultations

F. Roques[1] and M. Moncuquet[1]

[1] Département de recherche spatiale (DESPA), Observatoire de Paris, 92195 Meudon, France

We explore the possibility of detecting small Kuiper Belt Objects (KBO) by serendipitous observation of stellar occultations: We show that such unpredictable occultations may allow us to detect a population of very small objects (typically of $\sim$100 m radius at 40 AU), invisible by any other observational method, as long as (i) the assumed population fills up a sufficient area on the sky plane, (ii) the instrumental sensitivity and acquisition frequency are high enough and (iii) the observed star has a small angular radius. This result is basically due to the diffractive broadening of the geometric shadow of small (assumed numerous) occulting objects. This diffractive broadening is more pronounced for smaller stellar disks and better photometric precision. Assuming there exist about 10^{11} objects of radius $\rho > 1$ km, located between 30 and 50 AU near the Ecliptic, and that the differential size distribution varies as ρ^{-q} with the index $q = 4$ extending down to decameter-sized objects, we expect a number of valid occultations (i.e., a 4σ event) between a few to several tens per night, if we may obtain an r.m.s. signal fluctuation $\sigma \lesssim 1\%$ and observe a star in the ecliptic with an angular radius $\lesssim$ 0.01 mas. Since this occultation rate is very sensitive to the index slope q and plummets when $q \lesssim 3$, a KBO occultation observation campaign could provide a decisive constraint on the actual slope of the KBO size distribution for sub-kilometer-sized objects. Blue O class stars are the best candidates for detecting KBOs since they have the smallest angular radius for a given visual magnitude. The occultation events are typically very brief ($\lesssim$ 1 s) and they are shorter but more numerous when observed in the antisolar direction, so rapid photometry(¿1 Hz)

is required and high speed photometry($\gtrsim 20$ Hz) is preferred. The French space mission Corot will provide an excellent opportunity to observe occultations by KBOs using high precision photometry.

Published in: Icarus, 147, 530 (2000 October)
For preprints, contact roques@obspm.fr
or on the web at http://despa.obspm.fr/~roques/odksweb.html

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The Spacewatch Wide Area Survey for Bright Centaurs and Transneptunian Objects

Jeffrey A. Larsen[1], Arianna E. Gleason[1], Nichole M. Danzl[1], Anne S. Descour[1] , Robert S. McMillan[1], Tom Gehrels[1], Robert Jedicke[1], Joseph L. Montani[1], and James V. Scotti[1]

[1] Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ 85712, USA

We have conducted a large-area search for the brightest members of the Transneptunian and Centaur/Scattered-Disk asteroid populations by reprocessing archival scans from the Spacewatch 0.9 meter telescope at Kitt Peak. Our survey encompasses 331 scans taken from September of 1995 to September of 1999 and has a raw sky coverage of 1483.8 square degrees. We discovered five Transneptunians and five Centaur/Scattered Disk objects using an automated motion detection code. In addition, we serendipitously found four Transneptunians and two Centaur/Scattered-Disk objects that had been previously discovered. This survey is unique in that it involves a method which has a reasonable chance to re-acquire its lost objects.

In this paper we develop techniques to aid our understanding of our software efficiency and survey procedures. We use this understanding to "convolve" our raw sky coverage with our measured detection efficiency and a model of our scan coverage to estimate what fraction of survey areas can be considered "new". Our large sky coverage extends the cumulative luminosity function of the Transneptunians into a region previously constrained only by upper limits and allows a power law fit to be attempted to the Centaur cumulative luminosity function. In objects per square degree brighter than R=21.5, we find cumulative surface densities of Centaurs to be 0.017 ± 0.011, of Transneptunians to be 0.040 ± 0.018 and Scattered Disk Objects to be 0.007 ± 0.004. We extrapolate these values to estimate the number of each class in the Ecliptic brighter than R=21.5: 100 Centaurs, 400 Transneptunians, and 70 Scattered Disk Objects.

Orbit analysis by the Minor Planet Center suggests that three of our five Transneptunians are resonators: 1998 VG_{44} is in the 3:2, 1995 SM_{55} appears to be in the 5:3, and 1998 SN_{165} appears to be in the 7:5 resonance.

To appear in: The Astronomical Journal
For preprints, contact jlarsen@lpl.arizona.edu

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Thermal Evolution of the Centaur Object 5145 Pholus

M.C. De Sanctis[1], M.T. Capria[1], A. Coradini[1], and R. Orosei[1]

[1] Istituto di Astrofisica Spaziale CNR, Area di Ricerca di Roma Tor Vergata, via del Fosso del Cavaliere, 100, 00133 Roma, Italia

We present the results obtained by the simulations of different thermal models of 5145 Pholus, one of the known Centaurs. Pholus orbit is highly eccentric, similar to that of comets but its dimension is more similar to larger asteroids. Pholus cannot be clearly numbered into either class. The most likely source of Centaurs is the Edgeworth-Kuiper Belt: dynamical studies and physical properties suggest that Pholus recently entered in the planetary zone. Here we assume that the nature of Pholus is that of a cometary body made by different ices and dust. We have computed the thermal evolution of this object under different conditions: as a "new" object, namely an undifferentiated body, and an "old" one, differentiated and aged in the Kuiper Belt. We have tried to see also the effects induced by the presence of an organic dust on the overall evolution. Both the "new" and the "old" object show low, but different, levels of gas activity.

Published in: Astronomical Journal, 120, 1571 (2000 September)

For preprints, contact M.C. De Sanctis at `cristina@ias.rm.cnr.it`
or on the web at
`http://www.journals.uchicago.edu/AJ/journal/issues/v120n3/200048/200048.html`

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Compositional Variation on the Surface of Centaur 8405 Asbolus

S.D. Kern[1,2], D.W. McCarthy[2], M.W. Buie[3],
R.H. Brown[2,4], H. Campins[2,5], and M. Rieke[2]

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[3] Lowell Observatory, 1400 W. Mars Hill Rd., Flagstaff, AZ 86001, USA

[4] Lunar and Planetary Laboratory, The University of Arizona, Tucson, AZ 85721, USA

[5] Research Corporation, 101 N. Wilmot Rd. Suite 250, Tucson, AZ 85711, USA

Near-infrared, 1-2 μm, spectra of the Centaur 8405 Asbolus (1995 GO) have been obtained by *HST/NICMOS*. Strong and variable absorption features indicate a significantly inhomogeneous surface characterized by water ice mixed with additional unknown constituents. Over a 1.7 hour interval, the observed spectra varied from nearly featureless to a very complicated absorption spectrum and the integrated flux varied in a manner consistent with previous lightcurve observations. The accepted rotation period of 8.9351 hours assumes a shape-dominated lightcurve. Our observations indicate that the lightcurve may in fact be albedo-dominated with a period of 4.47 hours, i.e., half the previous value.

Published in: The Astrophysical Journal Letters, 542, L155 (2000 October 20)

For preprints, contact `susank@olympus.as.arizona.edu`
or on the web at
`http://www.journals.uchicago.edu/ApJ/journal/issues/ApJL/v542n2/005502/005502.html`
See also: `http://oposite.stsci.edu/pubinfo/PR/2000/31/index.html`

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The Distribution and Physical State of H_2O on Charon

M.W. Buie[1] and W.M. Grundy[1]

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We present new 1.4-2.5 μm geometric albedo spectra of Charon taken with HST/NICMOS in 1998. These new data provide global coverage of the surface with four spectra at evenly spaced longitudes. The surface of Charon is seen to be globally dominated by H_2O ice. The data indicate the ice is in the crystalline phase at a temperature consistent with its heliocentric distance. The spectrum of Charon has only weak variations with longitude. There is an indication of a slightly stronger H_2O ice absorption on the leading hemisphere. No variations in the spectrum are seen in response to differing solar phase angle. From model fits there is no indication of any of the volatile species that are seen on Pluto, i.e., CO, CH_4, or N_2. There is spectroscopic evidence for a contaminant with an absorption coefficient which increases with wavelength past $\sim$2 μm. This contaminant is unidentified but is similar to what is seen on other icy satellites in the outer solar system. We also present a standard spectrophotometric model for Charon that can be used to subtract Charon light from ground based spectra of the combined Pluto-Charon system.

To appear in: Icarus

For preprints, contact `buie@lowell.edu`

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Subaru Infrared Spectroscopy of the Pluto-Charon System

Ryosuke Nakamura[1], Shinji Sumikawa[2], Masateru Ishiguro[2], Tadashi Mukai[2], Fumihide Iwamuro[3], Hiroshi Terada[3], Kentaro Motohara[3], Miwa Goto[3], Ryuji Hata[3], Tomoyuki Taguchi[3], Takashi Harashima[3], Norio Kaifu[3], Masahiko Hayashi[4], and Toshinori Maihara[5]

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[3] Department of Physics, Kyoto University, Kitashirakawa, Kyoto 606-01, Japan

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[5] Department of Astronomy, Kyoto University, Kitashirakawa, Kyoto 606-8502, Japan

We present the results of the near-infrared spectroscopy of the Pluto-Charon system, conducted in the K band at two different sub-Earth longitudes. The spatially resolved images resulted in separated spectra with a spectral resolution of approximately 530. The spectrum of Charon showed a broad absorption feature at 2 μm during both orbital phases, suggesting a uniform distribution of water ice. In the separated spectrum of Pluto obtained in June, we confirmed the absorption bands of solid methane, carbon monoxide, and nitrogen ices. Additional weak dips have been found at 2.28, 2.32, and 2.40 μm in the spectrum of the opposite side observed in May. In order to examine the carrier of these dips, we performed model calculations of the reflectance of Pluto using Hapke's bidirectional reflectance model for icy intimate mixtures. By adding a small amount of solid ethane into the mixture, we successfully reproduced the dips at 2.28 and 2.31 μm, but the absorption at 2.40 μm is more distinct than that in the observed spectrum.

Published in: Publications of the Astronomical Society of Japan, 52, 551

For preprints, contact `ryo@eorc.nasda.go.jp`

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Solar Gardening and the Seasonal Evolution of Nitrogen Ice on Triton and Pluto

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[1] Lowell Observatory, 1400 W. Mars Hill Rd., Flagstaff AZ 86001, USA

[2] Steward Observatory, University of Arizona, 933 N Cherry Ave, Tucson AZ 85721, USA

Nitrogen ice, probably the dominant high albedo surface material on Pluto and Triton, has optical constants that are more strongly absorbing in the thermal infrared than at visible wavelengths. This optical behavior results in absorption of sunlight, on average, at greater depths than the depths from which thermal emission emerges, producing a vertical imbalance between heating and cooling of a sunlit nitrogen ice surface. Assuming the ice is sufficiently permeable to gas flow that the bulk ice is in vapor pressure equilibrium with the nitrogen atmosphere, this vertical distribution of heating and cooling drives net sublimation at depth and condensation closer to the surface. Over time scales much shorter than seasonal time scales on Triton and Pluto, this process of solar gardening will tend to produce a characteristic textural and compositional distribution which has important photometric, spectroscopic, and seasonal consequences. Solar gardening may help explain several previously puzzling observations including the anomalously strong spectral absorption by methane ice in spectra of Triton and Pluto in the 0.7-1.1 μm range and the surprising persistence of Triton's south polar cap at low latitudes during southern summer.

To appear in: Icarus

For preprints, contact grundy@lowell.edu
or on the web at http://www.lowell.edu/users/grundy/gardening.html

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PAPERS RECENTLY SUBMITTED TO JOURNALS

The Kuiper Belt and Olbers Paradox

Scott J. Kenyon[1] and Rogier A. Windhorst[2]

[1] Smithsonian Astrophysical Observatory, 60 Garden Street, Cambridge, MA 02138, USA

[2] Dept of Physics & Astronomy, Arizona State University, Box 871504, Tempe , AZ 85287-1504, USA

Submitted to: Astrophysical Journal Letters

For preprints, contact skenyon@cfa.harvard.edu
or on the web at http://xxx.arXiv.org/abs/astro-ph/0009162

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The Inclination Distribution of the Kuiper Belt

Michael E. Brown[1]

[1] Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125, USA

Submitted to: The Astronomical Journal

Preprints on the web at www.gps.caltech.edu/~mbrown/papers

OTHER PAPERS OF INTEREST

Cometary Collisional Evolution During Ejection to the Oort Cloud

S.A. Stern[1] and P.R. Weissman[2]

[1] Southwest Research Institute, Suite 426, 1050 Walnut Street, Boulder, CO 80302, USA

[2] Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, USA

Submitted to: Nature

For preprints, contact alan@boulder.swri.edu

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The Activity of Comet 29P/Schwassmann-Wachmann 1 Monitored Through its CO J=2-1 Radio Line

M.C. Festou[1], M. Gunnarsson[2], H. Rickman[2], A. Winnberg[3], and G. Tancredi[4]

[1] Southwest Research Institute, Dept. of Space Studies, Boulder, USA

[2] Astronomiska Observatoriet, Uppsala, Sweden

[3] Onsala Rymdobservatorium, Onsala, Sweden

[4] Dpto. Astronomia, Fac. Ciencias, Igua 4225, Montevideo, Uruguay

To appear in: Icarus

For preprints, contact festou@ast.obs-mip.fr

or on the web at http://webast.ast.obs-mip.fr/people/festou/papers.html

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The Discovery of Argon in Comet Hale-Bopp

S.A. Stern[1], D.C. Slater[2], M.C. Festou[1,3], J.Wm. Parker[1], R. Gladstone[2], M.F. A'Hearn[4], and E. Wilkinson[5]

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[2] Southwest Research Institute, San Antonio TX 78256, USA

[3] Observatoire Midi-Pyrenées, Toulouse, France

[4] Department of Astronomy, University of Maryland, College Park, MD 20742, USA

[5] CASA, University of Colorado, Boulder, CO 80302, USA

To appear in: The Astrophysical Journal Letters

For preprints, contact alan@boulder.swri.edu

or on the web at http://www.boulder.swri.edu/~joel/papers.html

CONFERENCE CONTRIBUTIONS

[The DPS meeting will begin soon after this issue of the Newsletter is sent out, so below I include the Kuiper Belt related papers that I found in the program (`http://www.aas.org/dps2000/`). Since the IAU meeting has already passed, I will include the titles only of those contributions that were submitted to the Newsletter, though the full program and Kuiper belt related talks can be found at: `http://www.iau.org/ffscp.htm#JD4` — Ed.]

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Regarding the Criteria for Planethood and Proposed Classification Schemes

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[1] Southwest Research Institute, Suite 426, 1050 Walnut Street, Boulder, CO 80302, USA

To appear in: IAU Proceedings

For preprints, contact `alan@boulder.swri.edu`

or on the web at `http://www.boulder.swri.edu/~alan/papers.html`

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Resonant Gaps in the Scattered Cometary Population of the Trans-Neptunian Region

Tanya Taidakova[1], Leonid M. Ozernoy[2], and Nick N. Gorkavyi[3]

[1] Computational Consulting Service, MD, simeiz@aol.com

[2] 5C3, School of Computational Sciences and Department of Physics & Astronomy, George Mason U., Fairfax, VA 22030-4444; ozernoy@science.gmu.edu

[3] NASA/GSFC, Greenbelt, MD 20771; gorkavyi@stars.gsfc.nasa.gov

To appear in: IAU Proceedings

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DPS Meeting

- Session 19. **Trojans, Centaurs, Kuiper Belt Objects - I**
  Tuesday, October 24, 11:10am-12:10pm
  `http://www.aas.org/publications/baas/v32n3/dps2000/S190.htm`
  - 19.03 *The Inhomogeneous Surface of Centaur 8405 Asbolus*
    S.D. Kern, R.H. Brown, H. Campins, M. Rieke
    `http://www.aas.org/publications/baas/v32n3/dps2000/423.htm`
  - 19.04 *The Centaur Population*
    S.S. Sheppard, D.C. Jewitt, C.A. Trujillo, M.C.B. Ashley
    `http://www.aas.org/publications/baas/v32n3/dps2000/69.htm`
  - 19.05 *Discovery Circumstances and Photometric Properties of 2000 EB_{173}, the Brightest Known trans-Neptunian Object*
    D. Rabinowitz, Quasar Equatorial Survey Team
    `http://www.aas.org/publications/baas/v32n3/dps2000/419.htm`
  - 19.06 *Shepherding the Kuiper Belt Via Ragged Planet-Migration*
    J. Hahn
    `http://www.aas.org/publications/baas/v32n3/dps2000/152.htm`

- Session 20. **Trojans, Centaurs, Kuiper Belt Objects - II**
  Tuesday, October 24, 1:30-3:30pm
  `http://www.aas.org/publications/baas/v32n3/dps2000/S200.htm`
  - 20.01 *The Deep Ecliptic Survey*
    R. L. Millis, M. W. Buie, L. H. Wasserman, R. M. Wagner
    `http://www.aas.org/publications/baas/v32n3/dps2000/18.htm`
  - 20.02 *Orbital Inclinations of Kuiper Belt Objects: Results from the Deep Ecliptic Survey*
    J.L. Elliot, S.D. Kern, R.L. Millis, M.W. Buie, L.H. Wasserman, R.M. Wagner
    `http://www.aas.org/publications/baas/v32n3/dps2000/28.htm`
  - 20.03 *The Distant Kuiper Belt*
    B. Gladman, J.M. Petit, A. Morbidelli
    `http://www.aas.org/publications/baas/v32n3/dps2000/62.htm`
  - 20.04 *The Kuiper Belt: Results from the CFHT 12k$\times$8k Survey*
    C.A. Trujillo, D.C. Jewitt
    `http://www.aas.org/publications/baas/v32n3/dps2000/469.htm`
  - 20.05 *The Edge of the Solar System*
    R. L. Allen, G. M. Bernstein
    `http://www.aas.org/publications/baas/v32n3/dps2000/530.htm`
  - 20.06 *Red Snowballs on the Ragged Edge of the Solar System*
    W. Romanishin
    `http://www.aas.org/publications/baas/v32n3/dps2000/425.htm`
  - 20.07 *Colors of Kuiper Belt Objects from Keck and Subaru*
    D. Jewitt, C. Trujillo
    `http://www.aas.org/publications/baas/v32n3/dps2000/272.htm`
  - 20.08 *Near-infrared Spectroscopy of Kuiper Belt Objects*
    M.E. Brown
    `http://www.aas.org/publications/baas/v32n3/dps2000/280.htm`
  - 20.09 *Centaur and TNO Near-infrared Spectroscopy Program at ESO-VLT*
    M.A. Barucci, C. de Bergh, J. Romon, A. Le Bras
    `http://www.aas.org/publications/baas/v32n3/dps2000/6.htm`
  - 20.10 *Toward a Centaur/TNO Taxonomy*
    M. Fulchignoni, M.A. Barucci, A. Doressoundiram, J. Romon, M. Birlan
    `http://www.aas.org/publications/baas/v32n3/dps2000/7.htm`
  - 20.11 *Devolatilization of Kuiper Belt Objects through Deep, Impact-Generated Fracture Systems*
    J.A. Stansberry, D.R. Davis
    `http://www.aas.org/publications/baas/v32n3/dps2000/600.htm`
  - 20.12 *Constraints on Collisional Evolution in the Edgeworth-Kuiper Belt: Exploiting the "Vesta Crust" Paradigm*
    D.D. Durda, S.A. Stern, J.I. Lunine, A. Morbidelli
    `http://www.aas.org/publications/baas/v32n3/dps2000/368.htm`

- Session 21. **Trojans, Centaurs, Kuiper Belt Objects (Posters)**
  Displayed all week, Highlighted Tuesday, October 24, 3:30-6:30pm
  `http://www.aas.org/publications/baas/v32n3/dps2000/S210.htm`

  - 21.01 *The Kuiper Belt Survey of the GEST Mission*
    K.H. Cook, A. Gould, D.C. Jewitt, D. Minniti, M. Shao, N.J. Woolf
    `http://www.aas.org/publications/baas/v32n3/dps2000/604.htm`
  - 21.02 *ESO Survey for Distant TNOs*
    A. Delsanti, O.R. Hainaut, H. Boehnhardt, C.E. Delahodde
    `http://www.aas.org/publications/baas/v32n3/dps2000/263.htm`
  - 21.03 *Dynamical Instabilities and the High Orbital Inclinations of Many Classical Kuiper Belt Objects*
    M. Kuchner
    `http://www.aas.org/publications/baas/v32n3/dps2000/160.htm`
  - 21.04 *TNO and Centaur Photometry and Spectroscopy: New Results and Statistical Analysis*
    O.R. Hainaut, H. Boehnhardt, T. Sekiguchi, C.E. Delahodde, R.M West, L. Barrera
    `http://www.aas.org/publications/baas/v32n3/dps2000/266.htm`
  - 21.05 *Properties of 2060 Chiron from infrared ISOPHOT observations*
    O. Groussin
    `http://www.aas.org/publications/baas/v32n3/dps2000/43.htm`
  - 21.06 *New Results on Centaurs 1997CU26 and 1999UG5*
    N. Peixinho, P. Lacerda, M. Roos-Serote, J. Ortiz, A. Doressoundiram
    `http://www.aas.org/publications/baas/v32n3/dps2000/57.htm`
  - 21.07 *Size, Shape, Rotation, and Color of the Outer Solar System Object 1999 TD10*
    G.J. Consolmagno, T. Rettig, W. Romanishin
    `http://www.aas.org/publications/baas/v32n3/dps2000/51.htm`
  - 21.08 *Thermal Emission from Two Centaurs and Two Possible Extinct Comets*
    Y.R. Fernandez, D.C. Jewitt, S.S. Sheppard
    `http://www.aas.org/publications/baas/v32n3/dps2000/386.htm`
  - 21.09 *Physical Properties of TNO 1996 TO66: One Year Later*
    T. Sekiguchi, H. Boehnhardt, C.E. Delahodde, O.R. Hainaut
    `http://www.aas.org/publications/baas/v32n3/dps2000/265.htm`
  - 21.10 *Multi-color Photometry of Trans-Neptunian Objects*
    A. Doressoundiram, M.A. Barucci, J. Romon
    `http://www.aas.org/publications/baas/v32n3/dps2000/56.htm`
  - 21.11 *Investigations Into the Dust Atmosphere of 2060 Chiron*
    K.D. Mach
    `http://www.aas.org/publications/baas/v32n3/dps2000/109.htm`

- Session 45. **Pluto and Triton**
  Thursday, October 26, 11:10am-12:10pm
  `http://www.aas.org/publications/baas/v32n3/dps2000/S450.htm`

  - 45.01 *A New Model for the Seasonal Evolution of Triton*
    F. Forget, N. Decamp, J. Berthier, C. Le Guyader
    `http://www.aas.org/publications/baas/v32n3/dps2000/210.htm`
  - 45.02 *Further Evidence for Increasing Pressure and a Non-spherical Shape in Triton's Atmosphere*
    M.J. Person, J.L. Elliot, S.W. McDonald, M.W. Buie, E.W. Dunham, R.L. Millis, R.A. Nye, C.B. Olkin, L.H. Wasserman, L.A. Young, J.M. Pasachoff, B.A. Babcock, T.M. McConnochie
    `http://www.aas.org/publications/baas/v32n3/dps2000/349.htm`
  - 45.03 *HST Measurement of the Charon/Pluto Mass Ratio*
    L.H. Wasserman, C.B. Olkin, O.G. Franz
    `http://www.aas.org/publications/baas/v32n3/dps2000/259.htm`
  - 45.04 *Pluto: Photometric Evidence for Volatile Transport?*
    B.J. Buratti, A. Heinze
    `http://www.aas.org/publications/baas/v32n3/dps2000/118.htm`
  - 45.05 *Continued Evolution in the Lightcurve of Pluto*
    M.W. Buie, W.M. Grundy
    `http://www.aas.org/publications/baas/v32n3/dps2000/560.htm`
  - 45.06 *Near-Infrared Spectral Monitoring of Pluto/Charon*
    W.M. Grundy, M.W. Buie
    `http://www.aas.org/publications/baas/v32n3/dps2000/550.htm`

- Session 46. **Pluto and Triton (Posters)**
  Displayed all week, Highlighted Thursday, October 26, 3:30-6:30pm
  `http://www.aas.org/publications/baas/v32n3/dps2000/S460.htm`

  - 46.01 *A Two-Color Map of Pluto Based on Mutual Event Lightcurves*
    E.F. Young, K. Crane
    `http://www.aas.org/publications/baas/v32n3/dps2000/588.htm`
  - 46.02 *The UV Albedo of Triton in Late 1999 from HST/STIS Spectra and Images*
    L.A. Young, M.D. Hicks, J.A. Stansberry
    `http://www.aas.org/publications/baas/v32n3/dps2000/567.htm`
  - 46.03 *The Evolution and Dynamics of Quasi-Collisional Gas Tori (Case of the Triton Tori)*
    M.L. Marconi
    `http://www.aas.org/publications/baas/v32n3/dps2000/414.htm`

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⋆ Requests for collaboration or observing coordination
⋆ Table of contents/outlines of books
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⋆ Job advertisements
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