Issue No. 20 *November 2001*

DISTANT EKOs

The Kuiper Belt Electronic Newsletter

Edited by: Joel Wm. Parker

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CONTENTS

NEWS & ANNOUNCEMENTS

DPS Workshop: *Kuiper Belt Discovery and Followup Observations*
Monday, November 26, 2–3 p.m.
Burgundy A room, Hyatt Regency Hotel

A workshop will be held in conjunction with the New Orleans DPS meeting for those interested in or working on discovery, followup, and general astrometry and orbit determination of trans-Neptunian objects and Centaurs. The main goal of this workshop is to compare notes on how we, as a community, can best pool and coordinate our resources to maximize the return from our observing efforts. At present, the discoveries far exceed the time allocation and ability to get the needed followup observations, and objects are in danger of being lost in record numbers. This workshop is intended to address this issue, by having a few presentations followed by general discussion.

The workshop will be held on Monday, November 26 from 2–3 p.m. in the "Burgundy A" room at the meeting hotel (Hyatt Regency). Note that this day set aside for workshops is the day before the regular meeting sessions begin, so check your travel plans accordingly. Those interested in making short presentations during the workshop are requested to contact Joel Parker (`joel@boulder.swri.edu`).

Please mention this to any of your collaborators or others who might be interested in this workshop.

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Two more TNO binaries were announced, bringing the total to four (counting Pluto/Charon):

The discovery that 2001 QT297 is a binary TNO was announced in IAUC 7733 by Elliot and collaborators. The components differ in brightness by 0.55 mag, with a separation of 0.6 arcsec.
IAUC: `http://cfa-www.harvard.edu/iauc/07700/07733.html`
MPEC: `http://cfa-www.harvard.edu/mpec/K01/K01T38.html`

The discovery that 2001 QW322 is a binary TNO was announced in IAUC 7749 by Kavelaars and collaborators. The components have comparable magnitudes with a separation of 4 arcsec.
IAUC: `http://cfa-www.harvard.edu/iauc/07700/07749.html`
MPEC: `http://cfa-www.harvard.edu/cfa/ps/mpec/K01/K01V34.html`
More information at: `http://pinks.physics.mcmaster.ca/binary`

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Release 2.0 of Bernstein-Khushalani KBO Orbit-Fitting Software Now Available
Several KBO observers are now using orbit-fitting software based on the methods of Bernstein & Khushalani (2000, AJ 120 3323). A revised version of the code is now available. The main change is that degenerate orbits are now handled more reliably, and some situations in which unrealistically small uncertainties were produced on positions and orbital elements of degenerate orbits have been rectified. Other improvements include a facility for crude treatment of orbiting observatories such as HST, and more command-line options for ease of use. If you are using the old software, you are encouraged to grab Release 2.0, available at:
`http://www.astro.lsa.umich.edu/users/garyb/WWW/KBO/orbfit2_0.tar.gz`

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There were 58 new TNO discoveries announced since the previous issue of the *Distant EKOs* Newsletter (and counting binaries as one object):

2001 DM108, 2001 DN108, 2001 DO108, 2001 DP108, 2001 FC193, 2001 FD193, 2001 FE193, 2001 FF193, 2001 FG193, 2001 FH193, 2001 FJ193, 2001 FK193, 2001 FL193, 2001 OG109, 2001 QA298, 2001 QB298, 2001 QC298, 2001 QD298, 2001 QE298, 2001 QF298, 2001 QG298, 2001 QH298, 2001 QJ298, 2001 QO297, 2001 QP297, 2001 QQ297, 2001 QR297, 2001 QS297, 2001 QT297, 2001 QU297, 2001 QV297, 2001 QW297, 2001 QX297, 2001 QY297, 2001 QZ297, 2001 QQ322, 2001 QR322, 2001 QS322, 2001 QT322, 2001 QW322, 2001 QX322, 2001 RU143, 2001 RV143, 2001 RW143, 2001 RX143, 2001 RY143, 2001 RZ143, 2001 SD291, 2001 SE291, 2001 UA17, 2001 UB17, 2001 UC17, 2001 UN18, 2001 UO18, 2001 UP18, 2001 UQ18, 2001 UR163, 2001 VN71

and 2 new Centaur/SDO discoveries:

2001 OM109, 2001 SQ73

Reclassified objects:
2000 QB243 (Centaur → SDO)
2000 OM67 (TNO → SDO)
2000 PH30 (TNO → SDO)
2001 KB77 (SDO → TNO)
2001 KY76 (TNO → SDO)

Objects recently assigned numbers:
1999 TD10 (29981)

Current number of TNOs: 487 (plus Pluto & Charon, and three other TNO binary companions)
Current number of Centaurs/SDOs: 83

PAPERS ACCEPTED TO JOURNALS

Visible and Near-IR Observations of Transneptunian Objects: Results from ESO and Calar Alto Telescopes

H. Boehnhardt[1], G.P. Tozzi[2], K. Birkle[3], O. Hainaut[1], T. Sekiguchi[1], M. Vair[1], J. Watanabe[4], G. Rupprecht[5], and the FORS Instrument Team[6,7,8]

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[8] Universitts-Sternwarte Mnchen, Scheinerstr. 1, 81679 Mnchen, Germany

We present visible ($BVRI$) and near-IR (JHK_s) broadband photometry and visible low-dispersion spectroscopy of Transneptunian Objects (TNOs) and Centaurs. In total, 16 TNOs and 1 Centaur were observed over the past two years at ESO telescopes in La Silla and Paranal in Chile as well as at the Calar Alto Observatory in Spain. The sample consists of objects measured for the first time and those for which comparison data is available from literature. The targets were: 1992QB1, 1993RO, 1994EV3, 1995HM5, 1995SM55, 1996RQ20, 1996TL66, 1996TO66, 1996TP66, 1997CQ29, 1997CS29, 1998HK151, 1998TF35, 1998VG44, 1998WH24, 1998XY95, 1999TC36. The spectra of 5 TNOs (1995SM55, 1996TO66, 1997CQ29, 1997CS29, 1998HK151) show almost constant gradients over the visible wavelength range with only marginal indication for a flatter slope beyond 750–800 nm. The photometric colour gradients obtained quasi-simultaneously are in good agreement with the spectral data. This suggests that in general photometric colour gradients are a valuable diagnostic tool for spectral type classification of TNOs. The photometric study revealed a number of new objects with neutral and red colours. For re-measured objects the published broadband colours were—in general—confirmed, although a few remarkable exceptions exist. Two TNOs appear to be outlyers according to the available broadband colours: 1993EV3 and 1995HM5. 1995SM55 is the bluest TNO measured so far. No clear global correlation between $V-I$ colour and absolute R filter brightness of our TNO targets is found. However, the data for the 5 brightest TNOs (brighter than 5 mag absolute magnitude) could also be interpreted with a linear increase of $V-I$ colour by about 0.75 mag per brightness magnitude. The colour-colour diagrams show continuous reddening of the TNOs in $V-R$ vs. $B-V$, $R-I$ vs. $B-V$ and $R-I$ vs. $V-R$. The bimodality suggested from earlier measurements of Tegler & Romanishin (1998) is not confirmed. According to our colour gradient statistics (number of objects per gradient interval) most of the TNOs have surface reddening between 0 and 40%/100 nm. For the Cubewanos the major population falls between 20–40%/100 nm. The Plutinos and Centaurs show a bifold grouping, i.e. a neutral/slightly reddish group (reddening <20%/100 nm) and a red group (reddening 30–40%/100 nm). The statistical significance of the various populations found is suffering - for the Centaurs and scattered disk objects very severely - from the small number of objects measured. However, the diversity of the reddening distribution of Centaurs/Plutinos and Cubewanos, if confirmed by new observations, may indicate a different balancing of resurfacing processes for these object types: for instance, for Centaurs a possibility is that re-condensed frost from coma activity may be dominant over impact re-surfacing and high energy surface processing.

Published in: Astronomy & Astrophysics, 378, 653 (2001 November)

For preprints, contact `hboehnha@eso.org`

BVRI Photometry of 27 Kuiper Belt Objects with ESO/Very Large Telescope

A.C. Delsanti[1,2], H. Boehnhardt[1], L. Barrera[3], K.J. Meech[4], T. Sekiguchi[5], and O.R. Hainaut[1]

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We present visible (BVRI) photometric measurements of 27 Trans-Neptunian objects, obtained with the FORS2 instrument on the ESO/8m Very Large Telescope (Unit 2) from runs during September and November 2000. The objects display a broad and continuous range of colors from neutral-bluish to very red. Most of the objects also have a linear reflectivity spectrum over the VRI range. There is no evidence of a bimodal color distribution as has been previously reported by other groups. Several objects (1994 TB, 1995 SM_{55}, 1998 UR_{43}, 1999CF_{119} and 2000 OK_{67}) show evidence for changing color, and should be investigated further. The object 1995 SM_{55} deserves a more complete study since its neutral-blue colors suggest it could be a good candidate for hosting cometary activity.

To appear in: Astronomy & Astrophysics

For preprints, contact adelsant@eso.org

or on the web at http://www.sc.eso.org/~adelsant/Publications/index.html

From Kuiper Belt Object to Cometary Nucleus: The Missing Ultra-Red Matter

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We combine new and published data to show that the optical color distributions of cometary nuclei and Kuiper Belt Objects are significantly different. The nuclei are, as a group, bluer than the Kuiper Belt Objects, indicating that the surface chemical and/or physical properties of the two types of body are different. Objects in the dynamically intermediate Centaur class have optical colors like those of Kuiper Belt Objects while the color distribution of candidate dead comets is indistinguishable from that of the cometary nuclei. We infer that the surfaces of Kuiper Belt Objects are modified upon entry to the inner solar system. We consider several mechanisms, and conclude that the color change is most likely caused by the rapid burial of ancient surface materials exposed in the Kuiper Belt. The distinctive, ultra-red material that is present on the surfaces of some Kuiper Belt Objects is absent on the cometary nuclei.

To appear in: The Astronomical Journal (2002 February)

For preprints, contact jewitt@ifa.hawaii.edu

or on the web at http://www.ifa.hawaii.edu/faculty/jewitt/papers/NUCLEUS/

1998 SM_{165} — A Large Kuiper Belt Object With An Irregular Shape

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The recent discovery of an ancient reservoir of icy bodies at and beyond the orbit of Neptune - the Kuiper belt - has opened a new frontier in astronomy. Measurements of the physical and chemical nature of Kuiper belt objects (KBOs) can constrain our ideas of the processes of planet formation and evolution. Our 1.8-m Vatican Advanced Technology Telescope and charge-coupled device camera observations of the KBO 1998 SM_{165} indicate its brightness periodically varies by 0.56 magnitudes over a 4-hr interval. If we assume a uniform albedo of 0.04, which is typical of values found in the literature for a handful of KBOs, and an equator-on aspect, we find 1998 SM_{165} has axes of length 600 x 360 km. If our assumptions are correct, such dimensions put 1998 SM_{165} among the largest elongated objects known in the solar system. Perhaps long ago, two nearly spherical KBOs of comparable size coalesced to form a compound object, or perhaps 1998 SM_{165} is the residual core of a catastrophic fragmentation of a larger precursor.

Published in: Proceedings of the National Academy of Sciences (9 October 2001)
For preprints, contact `Stephen.Tegler@nau.edu`

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Thermal Properties of Centaurs Asbolus and Chiron

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We have measured the mid-infrared thermal continua from two Centaurs, inactive (8405) Asbolus and active 95P=(2060) Chiron, and have constrained their geometric albedos, p, and effective radii, R, with the Standard Thermal Model for slow rotators. These are the first such measurements of Asbolus; we find $R = 33$ km $\pm$ 2 km and $p = 0.12 \pm 0.03$. This albedo is higher than all of those confidently known for active cometary nuclei. The thermal inertia is comparable to or lower than those of main belt asteroids, the Moon, and Chiron; lower than those of the icy Galilean satellites; and much lower than those of near-Earth asteroids. For Chiron, we find $R = 74$ km $\pm$ 4 km and $p = 0.17 \pm 0.02$. While this albedo is consistent with the established value, previous radiometry by others implied a larger radius. This effect may be partially due to a varying infrared dust coma but all datasets have too low signal to be sure. Four Centaur albedos (out of about 30 objects) are now known. They show a diversity greater than that of the active comets, to which they are evolutionarily linked.

To appear in: The Astronomical Journal (2002 February)
For preprints, contact `yan@ifa.hawaii.edu`
or on the web at `http://www.ifa.hawaii.edu/~yan/papers/centaurs/`

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Solar System Objects Observed in the Sloan Digital Sky Survey Commissioning Data

Željko Ivezić[1], et al.

[1] Princeton University Observatory, Princeton, NJ 08544, USA

We discuss measurements of the properties of ∼10,000 asteroids detected in 500 deg^2 of sky in the Sloan Digital Sky Survey (SDSS) commissioning data. The moving objects are detected in the magnitude range $14 < r^* < 21.5$, with a baseline of ∼5 minutes, resulting in typical velocity errors of ∼3%. Extensive tests show that the sample is at least 98% complete, with the contamination rate of less than 3%.

We find that the size distribution of asteroids resembles a broken power-law, independent of the heliocentric distance: $D^{-2.3}$ for 0.4 km $\lesssim D \lesssim$ 5 km, and D^{-4} for 5 km $\lesssim D \lesssim$ 40 km. As a consequence of this break, the number of asteroids with $r^* < 21.5$ is ten times smaller than predicted by extrapolating the power-law relation observed for brighter asteroids ($r^* \lesssim 18$). The observed counts imply that there are about 530,000 objects with $D > 1$ km in the asteroid belt, or about four times less than previous estimates. We predict that by its completion SDSS will obtain about 100,000 near simultaneous five-band measurements for a subset drawn from 280,000 asteroids brighter than $r^* < 21.5$ at opposition. Only about a third of these asteroids have been previously observed, and usually in just one band.

The distribution of main belt asteroids in the 4-dimensional SDSS color space is bimodal, and the two groups can be associated with S (rocky) and C (carbonaceous) asteroids. A strong bimodality is also seen in the heliocentric distribution of asteroids and suggests the existence of two distinct belts: the inner rocky belt, about 1 AU wide (FWHM) and centered at $R \sim 2.8$ AU, and the outer carbonaceous belt, about 0.5 AU wide and centered at $R \sim 3.2$ AU. The median color of each class becomes bluer by about 0.03 mag AU^{-1} as the heliocentric distance increases. The observed number ratio of S and C asteroids in a sample with $r^* < 21.5$ is 1.5:1, while in a sample limited by absolute magnitude it changes from 4:1 at 2 AU, to 1:3 at 3.5 AU. In a size-limited sample with $D > 1$ km, the number ratio of S and C asteroids in the entire main belt is 1:2.3.

The colors of Hungarias, Mars crossers, and near-Earth objects, selected by their velocity vectors, are more similar to the C-type than to S-type asteroids, suggesting that they originate in the outer belt. In about 100 deg^2 of sky along the Celestial Equator observed twice two days apart, we find one plausible Kuiper Belt Object (KBO) candidate, in agreement with the expected KBO surface density. The colors of the KBO candidate are significantly redder than the asteroid colors, in agreement with colors of known KBOs. We explore the possibility that SDSS data can be used to search for very red, previously uncatalogued asteroids observed by 2MASS, by extracting objects without SDSS counterparts. We do not find evidence for a significant population of such objects; their contribution is no more than 10% of the asteroid population.

Published in: The Astronomical Journal, 122, 2749 (2001 November)

For preprints, contact ivezic@astro.princeton.edu

or on the web at http://xxx.lanl.gov/abs/astro-ph/0105511

Upper Limits on Gaseous CO at Pluto and Triton from High-Resolution Near-IR Spectroscopy

Leslie A. Young[1], Jason C. Cook[2], Roger V. Yelle[3], and Eliot F. Young[1]

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[3] Physics and Astronomy Department, Northern Arizona University, Flagstaff, Arizona, USA

We observed Pluto and Triton with the CSHELL echelle spectrograph on the Infrared Telescope Facility in April and July 1996, in an effort to detect the R(2), R(3), and R(4) rotational lines of the 2-0 vibrational transition of gaseous CO. As no lines were detected, we derived 3-σ; upper limits on the average widths of these three lines of 0.040 cm^{-1} for Pluto and 0.028 $^{-1}$ for Triton. The corresponding upper limits on the gaseous CO mole fractions depend on the assumed profiles of temperature and pressure in the atmospheres of these bodies. If Triton's atmosphere in 1996 resembles that measured by stellar occultation in 1997, we find a 3-σ; upper limit to the CO mole fraction of 59%. If Pluto's atmosphere resembles the tropospheric model of J.A. Stansberry, J.I. Lunine, W.B. Hubbard, R.V. Yelle, and D.M. Hunten (1994), Icarus 11, 503–513, we find a 3-σ; upper limit to the CO mole fraction of 6%. For Pluto, this limit to the gaseous mole fraction argues against intimate mixtures (e.g., "salt-and-pepper" mixtures, as opposed to solid solutions) of surface CO and N_2 frost.

Published in: Icarus, 153, 148 (2001 September)

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

or on the web at

`http://www.boulder.swri.edu/~layoung/eprint/COupperlim/Young2001_CO.pdf`

PAPERS RECENTLY SUBMITTED TO JOURNALS

On the Formation of the Binary Kuiper Belt Objects 1998 WW31 and 2001 QT279

Michael E. Brown[1]

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Submitted to: The Astrophysical Journal Letters

For preprints, contact `mbrown@caltech.edu`

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

OTHER PAPERS OF INTEREST

Big Fish in the Kuiper Belt?

William Schomaker[1]

[1] Associate Editor, Astronomy Magazine

Astronomy, volume 29, number 10, page 24 (October 2001)

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The Kuiper Belt and Beyond

Clifford J. Cunningham

Mercury, volume 30, number 5, page 11 (September/October 2001)

CONFERENCE CONTRIBUTIONS

There are three meetings (DPS, AGU, AAS) coming up in the next couple months that have some Kuiper belt presentations. These are the ones I have gleaned from the online programs. Apologies for any that I missed.

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DPS Meeting

2001 November 27 – December 1; New Orleans, Louisiana, USA
`http://www.boulder.swri.edu/dps01/`

- *TNO Discovery and Follow-up* (workshop)
  Monday November 26, 2–3 pm, Burgundy A
  `http://www.boulder.swri.edu/dps01/workshops.html`
- Session 6. **Kuiper Belt and KBOs I: Extent and Character** (oral)
  Tuesday, November 27, 2001, 2:00–3:20pm
  `http://www.aas.org/publications/baas/v33n3/dps2001/S60.htm`
  - 6.01 *The Deep Ecliptic Survey — A Status Report*
    R.L. Millis, M.W. Buie, L.H. Wasserman, J.L. Elliot, S.D. Kern, R.M. Wagner, E. Chiang, D. Trilling
    `http://www.aas.org/publications/baas/v33n3/dps2001/457.htm`
  - 6.02 *Discovery and long-term tracking of TNOs*
    J-M. Petit, B. Gladman, JJ Kavelaars, M. Holman, J. Parker, T. Grav, Ch. Veillet
    `http://www.aas.org/publications/baas/v33n3/dps2001/318.htm`
  - 6.03 *Evidence for an 'extended' scattered disk*
    B.J. Gladman, M. Holman, T. Grav, J. Kavelaars, P. Nicholson, K. Asknes, J-M. Petit
    `http://www.aas.org/publications/baas/v33n3/dps2001/320.htm`
  - 6.04 *Observational Limits on a Distant Thin Disk*
    R.L. Allen, G.M. Bernstein, R. Malhotra
    `http://www.aas.org/publications/baas/v33n3/dps2001/617.htm`
  - 6.05 *Multiplicity in the Kuiper Belt: The First Discovery of a Binary Trans-Neptunian Object*
    C. Veillet, J.W. Parker, I.P. Griffin, B.G. Marsden, A. Doressoundiram, D.J. Tholen, M.W. Buie, M.J. Holman
    `http://www.aas.org/publications/baas/v33n3/dps2001/557.htm`
  - 6.06 *(26308) 1998 SM165: A Large Kuiper Belt Object with an Irregular Shape*
    W. Romanishin, S.C. Tegler, T.W. Rettig, G. Consolmagno, B. Botthof
    `http://www.aas.org/publications/baas/v33n3/dps2001/273.htm`
  - 6.07 *Lightcurves of 13 Kuiper Belt Objects*
    S.S. Sheppard, D.C. Jewitt
    `http://www.aas.org/publications/baas/v33n3/dps2001/54.htm`
  - 6.08 *Research of small Kuiper Belt Objects by Stellar Occultations*
    F. Roques, N. Lavillonnière, M. Auvergne, M. Chevreton, F. Colas, J. Lecacheux, M. Moncuquet, J.M. Perrin
    `http://www.aas.org/publications/baas/v33n3/dps2001/410.htm`

- Session 8. **Kuiper Belt and KBOs II: Surfaces and Correlations** (oral)
  Tuesday, November 27, 2001, 3:50–5:00pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S80.htm

  - 8.01 *Optical Photometry of Classical Kuiper Belt Objects With the Keck I Telescope*
    S. C. Tegler, W. Romanishin
    http://www.aas.org/publications/baas/v33n3/dps2001/229.htm
  - 8.02 *Evidence for A Statistical Correlation Between KBO Colors and Mean Random Impact Speeds*
    S.A. Stern
    http://www.aas.org/publications/baas/v33n3/dps2001/154.htm
  - 8.03 *The inclination color correlation of the Kuiper belt objects*
    C.A. Trujillo, M.E. Brown, A.H. Bouchez
    http://www.aas.org/publications/baas/v33n3/dps2001/546.htm
  - 8.04 *Comets and Kuiper Belt Objects*
    D. Jewitt
    http://www.aas.org/publications/baas/v33n3/dps2001/40.htm
  - 8.05 *Spectroscopy of Centaurs Asbolus and Chiron: Observations over a full rotational period*
    J. Romon-Martin, M.A. Barucci, C. de Bergh, N. Peixinho
    http://www.aas.org/publications/baas/v33n3/dps2001/48.htm
  - 8.06 *The solar phase curve for the bright Plutino 2000 EB173*
    D. Rabinowitz, B. Schaefer
    http://www.aas.org/publications/baas/v33n3/dps2001/570.htm
  - 8.07 *Amorphization of crystalline water ice by ion radiation: Model results and implications for Kuiper Belt Objects*
    R.M.E. Mastrapa, R.H.B. Brown
    http://www.aas.org/publications/baas/v33n3/dps2001/543.htm

- Session 12. **Kuiper Belt and KBOs** (posters)
  Displayed, 9:00am Tuesday – 3:00pm Saturday
  Highlighted, Tuesday, November 27, 2001, 5:00–7:00pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S120.htm

  - 12.01 *Meudon Multicolor Survey of Outer Solar System Objects*
    A. Doressoundiram, N. Peixinho, M.A. Barucci, S. Fornasier, S. Blancho
    http://www.aas.org/publications/baas/v33n3/dps2001/304.htm
  - 12.02 *Portrait of two bright TNOs: 1999TC36 and 1998SN165*
    N. Peixinho, A. Doressoundiram, M.A. Barucci, J. Romon-Martin
    http://www.aas.org/publications/baas/v33n3/dps2001/305.htm
  - 12.03 *A Photometric Survey of the Kuiper Belt with HST*
    K. Noll, M. Buie, W. Grundy, R. Millis, J. Spencer, D. Cruikshank, W. Romanishin, S. Tegler
    http://www.aas.org/publications/baas/v33n3/dps2001/523.htm
  - 12.04 *KBOs BVRI photometry with ESO/Very Large Telescopes*
    A.C. Delsanti, H. Boehnhardt, L. Barrera, O.R. Hainaut
    http://www.aas.org/publications/baas/v33n3/dps2001/258.htm

– 12.05 *ESO Large Program for TNOs: Presentation and First Results*
M.A. Barucci, H. Boehnhardt, A.C. Delsanti, L. Barrera, C. de Bergh, K. Birkle, J. Davies, A. Doressoundiram, E. Dotto, O.R. Hainaut, M. Lazzarin, K.J. Meech, J.L. Ortiz, J. Romon, P. Rousselot, T. Sekiguchi, N. Thomas, G.P. Tozzi, J.I. Watanabe, R. West
`http://www.aas.org/publications/baas/v33n3/dps2001/490.htm`

– 12.06 *Broadband Photometry of KBOs and Centaurs with MagIC: Initial Results*
D. Osip, J.L. Elliot, S.D. Kern
`http://www.aas.org/publications/baas/v33n3/dps2001/326.htm`

– 12.07 *Colors and Compositional Characteristics of Kuiper Belt Objects and Centaurs*
S.M. Lederer, F. Vilas, K.S. Jarvis, L. French
`http://www.aas.org/publications/baas/v33n3/dps2001/536.htm`

– 12.08 *TNO/Centaurs grouping tested with asteroid data sets*
M. Fulchignoni, M. Birlan, M.A. Barucci
`http://www.aas.org/publications/baas/v33n3/dps2001/351.htm`

– 12.09 *Statistics of MBOSS colors*
O.R. Hainaut, A.C. Delsanti
`http://www.aas.org/publications/baas/v33n3/dps2001/259.htm`

– 12.10 *Rotation and Color Studies of Centaurs, KBOs and Comets*
T.L. Farnham
`http://www.aas.org/publications/baas/v33n3/dps2001/603.htm`

– 12.11 *A study of short term variability in 2001KX76, 1999TC36 and 2000QC243*
J.L. Ortiz, J.J. Lopez-Moreno, P.J. Gutierrez, S. Baumont
`http://www.aas.org/publications/baas/v33n3/dps2001/180.htm`

– 12.12 *Chiron's Spectrum at Outburst*
J.M. Bauer, K.J. Meech, T.C. Owen, T.L. Roush, S.E. Dahm
`http://www.aas.org/publications/baas/v33n3/dps2001/484.htm`

– 12.13 *Search for a cometary activity on three Centaurs: 2000 EC98, 2000 GM137 and 2000 FZ53*
P. Rousselot, J.M. Petit
`http://www.aas.org/publications/baas/v33n3/dps2001/424.htm`

– 12.14 *How well do we really know short–arc KBO orbital elements?*
L.H. Wasserman
`http://www.aas.org/publications/baas/v33n3/dps2001/512.htm`

– 12.15 *Orbits for Trans-Neptunian Objects Using Statistical Ranging*
J. Virtanen, K. Muinonen, G. Tancredi, E. Bowell
`http://www.aas.org/publications/baas/v33n3/dps2001/18.htm`

– 12.16 *A Large Area TNO survey with the Macho Telescope*
S. Marshall, K. Cook, T. Axelrod, R. Moody, B. Schmidt, C. Alcock, D. Engel, J. Goldader, M. Lehner
`http://www.aas.org/publications/baas/v33n3/dps2001/580.htm`

– 12.17 *A Tool for Observations of Centaurs/Kuiper Objects with Adaptive Optics systems*
J. Berthier, F. Marchis
`http://www.aas.org/publications/baas/v33n3/dps2001/278.htm`

- Session 14. **Decadal Survey** (posters)
  Displayed, 9:00am Tuesday – 3:00pm Saturday
  Highlighted, Tuesday, November 27, 2001, 5:00–7:00pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S140.htm

  - 14.15 *Report by the Community Panel for Kuiper Belt Research*
    W.M. Grundy and the community panel
    http://www.aas.org/publications/baas/v33n3/dps2001/587.htm
  - 14.16 *NGLT — A Solar System Survey Telescope for the Coming Decade*
    R.L. Millis, E.W. Dunham, E. Bowell, C.H. Smith, D.R. Blanco
    http://www.aas.org/publications/baas/v33n3/dps2001/210.htm

- Session 21. **Urey Prize Lecture**
  Wednesday, November 28, 2001, 2:00–3:00pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S210.htm

  - 21.01 *What Happened in the Outer Solar System?*
    M.E. Brown
    http://www.aas.org/publications/baas/v33n3/dps2001/487.htm

- Session 25. **Solar System Origins II** (oral)
  Wednesday, November 28, 2001, 5:00–6:30pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S250.htm

  - 25.08 *Landau Damping of Apsidal Spiral Density Waves in the Kuiper Belt*
    G.R. Stewart
    http://www.aas.org/publications/baas/v33n3/dps2001/217.htm
  - 25.09 *Nodal Waves in Particle Disks*
    Wm.R. Ward
    http://www.aas.org/publications/baas/v33n3/dps2001/S250.htm

- Session 51. **Invited Review**
  December 1, 2001, 9:00–9:40am
  http://www.aas.org/publications/baas/v33n3/dps2001/S510.htm

  - 51.01 *Asteroid Satellites*
    W.J. Merline
    http://www.aas.org/publications/baas/v33n3/dps2001/131.htm

- Session 62. **Laboratory Studies** (oral)
  Saturday, December 1, 2001, 4:40–5:50pm
  http://www.aas.org/publications/baas/v33n3/dps2001/S620.htm

  - 62.05 *The Formation of Nitrogen-Containing Ions on Outer Solar System Objects*
    R.L. Hudson
    http://www.aas.org/publications/baas/v33n3/dps2001/238.htm

AGU Meeting

2001 December 10–14; San Francisco, California, USA
`http://www.agu.org/meetings/fm01top.html`

- Session P32A. **Asteroids, Meteorites, and Comets** (poster)
  Wednesday, December 12, 2002
  `http://agu.org/cgi-bin/sessionsfm01?meeting=fm01&part=P32A`

  - P32A-0546 *Small Comet Abundance and Solar System Location*
    C.B. Phillips, J. Moore, K. Zahnle
  - P32A-0547 *Multiplicity in the Kuiper Belt: The First Discovery of a Binary Trans-Neptunian Object*
    J.Wm. Parker, C. Veillet, I. Griffin

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AAS Meeting

2002 January 6–10; Washington D.C., USA
`http://www.aas.org/meetings/aas199/program/`

- Session 28. **Solar System: Dynamics and Collisions** (oral)
  Monday, January 7, 2002, 10:00–11:30am
  `http://www.aas.org/publications/baas/v33n4/aas199/S280.htm`

  - 28.05 *Signatures of Planets: Observations and Modeling of Structure in the Zodiacal Cloud and Kuiper Disk*
    E.K. Holmes, S.F. Dermott
    `http://www.aas.org/publications/baas/v33n4/aas199/437.htm`

- Session 40. **HAD III: Some Controversies in the History of Astronomy** (oral)
  Monday, January 7, 2002, 2:00-3:30pm
  `http://www.aas.org/publications/baas/v33n4/aas199/S400.htm`

  - 40.03 *History and Myth: Trans-Neptunian Objects and Their Terminology*
    D.W.E. Green
    `http://www.aas.org/publications/baas/v33n4/aas199/233.htm`

- Session 63. **Solar System** (poster)
  Tuesday, January 8, 2002, 9:20am–6:30pm
  `http://www.aas.org/publications/baas/v33n4/aas199/S630.htm`

  - 63.10*A Deep Kuiper Belt Survey*
    R.L. Allen, G.M. Bernstein, R. Malhotra
    `http://www.aas.org/publications/baas/v33n4/aas199/1096.htm`
  - 63.11 *Stable and Chaotic Regions in the Extended Scattered Disk*
    A.L. Erickcek, M.J. Holman
    `http://www.aas.org/publications/baas/v33n4/aas199/485.htm`

- Session 101. **DPOSS, LONEOS, LSST and DLS: New Survey Results** (poster)
  Wednesday, January 9, 2002, 9:20am–6:30pm
  http://www.aas.org/publications/baas/v33n4/aas199/S1010.htm

  - 101.08 *The LSST and Solar System Science*
    K. Cook, B. Craig, J.A. Tyson, C. Stubbs, E.L. Bowell, A. Harris, R. Binzel, LSST Collaboration
    http://www.aas.org/publications/baas/v33n4/aas199/S1010.htm
  - 101.14 *The Deep Lens Survey : Real-time Optical Transient and Moving Object Detection*
    Andy Becker, David Wittman, Chris Stubbs, Ian Dell'Antonio, Dinesh Loomba, Robert Schommer, J. Anthony Tyson, Vera Margoniner, DLS Collaboration
    http://www.aas.org/publications/baas/v33n4/aas199/1051.htm

- Session 102. **Instrumentation for the Optical and Infrared** (poster)
  Wednesday, January 9, 2002, 9:20am–6:30pm
  http://www.aas.org/publications/baas/v33n4/aas199/S1020.htm

  - 102.01 *NGLT — A Status Report*
    R. L. Millis, E. W. Dunham, C. H. Smith, D. R. Blanco
    http://www.aas.org/publications/baas/v33n4/aas199/271.htm

- Session 111. **Science with Wide Field Imaging in Space** (oral)
  Wednesday, January 9, 2002, 10:00-11:30am
  http://www.aas.org/publications/baas/v33n4/aas199/S1110.htm

  - 111.01 *The Astronomical Potential of Wide-field Imaging from Space*
    S. Beckwith
    http://www.aas.org/publications/baas/v33n4/aas199/831.htm
  - 111.09 *An Outer Solar System Survey Using SNAP*
    H.F. Levison, J.Wm. Parker, B.G. Marsden
    http://www.aas.org/publications/baas/v33n4/aas199/893.htm

CONFERENCE INFORMATION

Debris Disks and the Formation of Planets: A Symposium in Memory of Fred Gillett

April 11–13, 2002
University Park Marriott, Tucson, Arizona, USA

Symposium agenda outline:

I. History of the discovery
II. Progenitors
    A. Protostellar disks: review w/emphasis on massive (Ae, Be) disks
    B. Dynamics and lifetimes of protostellar disks and massive stars
    C. Evidence and cautions re. "falling evaporating bodies"
III. Debris disks
    A. Overview/Review
    B. Latest observations of debris disks
    C. Stellar ages (and how dicey it still is to determine them)
    D. Young debris disks (¡ few x 10 Myr) and their gas content
    E. Old debris disks (few x 100's M yrs) and their dust content
IV. Descendants and connection to the Solar System
    A. Characteristics of other planetary systems
    B. Evidence in debris disk morphologies for planetary masses
    C. Evolution of the Kuiper Belt and connection to Vega-like systems
    D. Caution: history of our solar system may be quite untypical
V. Where do we go from here?
    A. Observatories and observations
    B. Theory/modeling required for making progress
VI. Summary/retrospective

Chairs of the scientific organizing committee:
Dana Backman: `backman@ssa1.arc.nasa.gov`, `dana@maunakea.fandm.edu`
Larry Caroff: `lcaroff@home.com`

Chair of the local organizing committee:
Steve Strom: `sstrom@noao.edu`

The *Distant EKOs* Newsletter is dedicated to provide researchers with easy and rapid access to current work regarding the Kuiper belt (observational and theoretical studies), directly related objects (e.g., Pluto, Centaurs), and other areas of study when explicitly applied to the Kuiper belt.

We accept submissions for the following sections:
⋆ Abstracts of accepted papers
⋆ Titles of submitted (but not yet accepted) papers and conference articles
⋆ Thesis abstracts
⋆ Short articles, announcements, or editorials
⋆ Status reports of on-going programs
⋆ Requests for collaboration or observing coordination
⋆ Table of contents/outlines of books
⋆ Announcements for conferences
⋆ Job advertisements
⋆ General news items deemed of interest to the Kuiper belt community

A LaTeX template for submissions is appended to each issue of the newsletter, and is sent out regularly to the e-mail distribution list. Please use that template, and send your submission to:

`ekonews@boulder.swri.edu`

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