



## Department of Space and Climate Physics Newsletter

### Volume 1, Issue 2

*23rd September 2003*

Covers events between 1<sup>st</sup> June 2003 and 31<sup>st</sup> August 2003

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#### **General News**

Len Culhane successfully had his hip replaced again. We hope this one will last and he'll soon return to work doing science!

The Space Plasma Physics Group has been renamed the Space Plasma and Planetary Physics Group.

#### **New Staff Members**

We welcome the following new staff:

- Andrew Lahiff - postdoctoral research fellow working on the PEACE project.
- Andrew Ridout - research fellow in the Climate Physics Group.
- Maria Sotirova - postdoctoral research fellow in the Solar /Stellar Physics Group.
- Armin Theissen - postdoctoral research fellow in the Solar /Stellar Physics Group.

## **Visitors**

We welcome the following long-term visitors:

Ingolf Dammasch (MPI Lindau) - visiting the Solar/Stellar Physics Group for 4 months from August.

Tomaz Zwitter (Univ. Ljubljana) - visiting Mark Cropper for 6 weeks until end of September to work on GAIA-RVS-related matters.

## **Appointments**

Andrew Coates - Philosophical Transactions of the Royal Society A editorial board member (Jan 2004 for 3 years).

UK COSPAR committee member from 2003.

UK SCOSTEP representative from 2003.

Lidia van Driel-Gesztelyi – IAU Commission 10. Re-elected member for 3 years.

## **Grants and Contracts Awarded**

Engineering Group - EUR 100k. Sub-contract from Alcatel Space (Cannes) for an 11 month definition study of the Eddington Focal Plane Assembly. (June 2003 - April 2004). Phil Guttridge coordinator.

Engineering Group - EUR ~30k for 6 months. Contract for Development Phase (Phase B1) of the JWST NIRSpec awarded by Alcatel. This will support work on instrument-level calibration tasks and the provision of the calibration subsystem, mainly in the last 3 months of the year with a trickle into 2004. Mark Cropper and Phil Guttridge coordinators.

Climate Physics - Contracts with ESA to build the operational L2 processing chains for the CryoSat Instrument Processing Facility (IPF2). (From 1 July 2003 for 1 year) and for further work on the CryoSat Level 1b processing chains (IPF1). (From 1 June 2003 for 10 months). Steven Baker PI.

Climate Physics - Sub-contract signed for participation in the ICEMON project (see <http://www.nersc.no/ICEMON>). This is part of the ESA/EU Global Monitoring for Environment and Security (GMES) programme. (From August 2003 for 13 months). Steven Baker & Seymour Laxon PIs.

Climate Physics - Contract with the Reuters Foundation AlertNet ([www.alertnet.org](http://www.alertnet.org)) to provide a real-time feed from the TSR (TropicalStormRisk.com) Tropical Storm Tracker. (From 1 October 2003 for 3 years). Mark Saunders PI.

Space Plasma and Planetary Physics – Travel grants for Nigel Meredith (from Royal Society) and Chris Owen (from IUGG).

## **Telescope/Satellite Time Awards**

### *1. XMM-Newton satellite time under AO3:*

Graziella Branduardi-Raymont PI	- Jupiter and its Galilean satellites (276 ks)
Alex Blustin PI	- Seyfert Galaxy (152 ks)
Gavin Ramsay PI	- 5 AM CVn stars (125 ks)
Gavin Ramsay PI	- 2 Dwarf Spheroidal Galaxies (76 ks)
Mat Page PI	- 3 Absorbed AGN (150 ks)
Mat Page PI	- Seyfert Galaxy (101 ks)
Silvia Zane PI	- 2 Pulsars (63 ks)
Urmilla Kraev PI	- Flare star (66 ks)
Silvia Zane PI	- Isolated neutron star (31 ks)

### *2. Chandra satellite time under AO5:*

Nicola Loaring PI - 3 Quasars (45 ks)

### *3. Ground based telescope time:*

Mat Page PI	- 2 nights WHT
Mat Page PI	- 6 nights AAT
Mat Page PI	- 15 hrs UKIRT
Mat Page PI	- 40 hrs JCMT
Gavin Ramsay PI	- 4 nights INT
Gavin Ramsay PI	- 2x2 nights NOT

## **Mission Status and Developments**

Beagle 2. Launched successfully from Baikonur on 2 June. Beagle 2 checkouts successful. Separation from Mars Express 20 December 2003. Beagle 2 is due to land on Mars at 0254 UT on 25 December 2003.

Cassini-Huygens. En route to Saturn, arrival 1 July 2004. CAPS-ELS is currently powered off awaiting new CAPS flight software.

Cluster. 3<sup>rd</sup> magnetotail phase underway, separation ~250km, successfully completed long eclipse season with all 4 PEACE instruments still working.

Double Star. Launches in December 2003 (equatorial satellite, instrument in China, spacecraft level thermal vacuum completed late August 2003, supported on site and remotely from MSSL) and in June 2004. (polar satellite, instrument currently at MSSL having completed thermal vacuum tests).

GAIA-RVS. Had Consortium meeting in August 2003 to trade off the options in the optical and focal plane designs, and to adopt a new baseline. Will be presented at the Design Review at ESTEC at end of September 2003. ESA contract for this Technical Assistance phase (approximately Phase A) runs until March 2004.

Mars Express. Launched successfully from Baikonur on 2 June. ASPERA near-Earth verification successful. Mars Express due to enter Martian orbit 25 December 2003.

MOSES. MOSES (Multi-Order Solar EUV Spectrograph) is a proof of concept sounding rocket payload to be launched in Spring 2004. Mike Chase from Montana State University was at the laboratory at the end of August to integrate the CCDs into the MOSES flight housings. MSSL staff will be performing characterisation of the CCDs throughout September 2003.

Rosetta. Target confirmed as Churyumov-Gerasimenko in 2014. Launch February 2004.

Solar-B EIS. Integration of the flight electronics for the Solar-B EIS instrument began at end of August 2003 after delivery from NRL of the Mechanism and Heater Control box. This was a major milestone for the project and the success of the integration a testament of the skills and dedication of the MSSL engineering team. Well done to you all.

Venus Express. Sensor calibration completed at MSSL. Radiation shield design under discussion.

XMM-NEWTON. Tracey Poole has designed two web based tools to aid users in writing proposals for the optical monitor on board XMM-Newton. The first tool is a web form that helps in planning observations of point sources, and the second is an interactive tool that helps to define and visualise user defined science windows.  
Tool 1: [http://www.mssl.ucl.ac.uk/www\\_astro/xmm/om/om\\_tool\\_current.html](http://www.mssl.ucl.ac.uk/www_astro/xmm/om/om_tool_current.html)  
Tool 2: [http://www.mssl.ucl.ac.uk/www\\_astro/xmm/om/om\\_wintool/om\\_tool2.html](http://www.mssl.ucl.ac.uk/www_astro/xmm/om/om_wintool/om_tool2.html)

## **Publications - Refereed**

Department authors are shown in bold.

### **A. Published**

**Gowen, R.A.**, and **A. Smith**, Square root data compression, *Rev. of Scientific Instruments*, **74**, no.8, p3853ff, 2003.

(Available via <http://ojps.aip.org/rsio/>).

This paper places particular emphasis on characterization of the reconstruction errors and their effect on the precision of the resulting science. It also comprehensively describes the properties of this scheme and provides the tools to tailor it to particular applications.

Hakala, P., **G. Ramsay**, K. Wu, L. Hjalmsdotter, S. Järvinen, A. Järvinen, and **M. Cropper**, Spin Up in RX0806+15: the Shortest Period Binary, *Monthly Notices of the Royal Astronomical Society*, **343**, L10-13, 2003.

We find that the shortest period binary system RX J0806+15 is spinning up. This is consistent with the uni-polar inductor model, but not with competing accretion driven models.

- Horne, R.B., R.M. Thorne, N.P. Meredith and R.R. Anderson**, Diffuse auroral electron scattering by electron cyclotron harmonic and whistler mode waves during an isolated substorm, *J. Geophys. Res.*, **108**(A7), 1290, doi:10.1029/2002JA009736, 2003.  
/home/npm/public\_html/papers/horne\_JGR\_2003b.pdf  
We examine a case event where whistler-mode hiss, chorus and ECH waves are intensified during a weak substorm injection to identify the source of the diffuse auroral electron precipitation. Our observations reveal that ECH waves are responsible for the observed pancake distribution and are probably the main component of the diffuse auroral electron precipitation during this event.
- Hunt, J.C.R., A. Orr, D. Cresswell** and A. Owinoh, Coriolis effects in mesoscale shallow layer flows', *Proceedings of the International Symposium on Shallow Flows* (edited by G. H. Jirka and W. S. J. Uijttewaal), Delft, 16-18 June 2003, pp117-124, 2003.
- Katsiyannis, A.C., **D.R. Williams**, R.T.J. McAteer, P.T. Gallagher, F.P. Keenan and F. Murtagh, Eclipse observations of high frequency oscillations in active region coronal loops, *Astronomy and Astrophysics*, **406**, 709-714, 2003.  
<http://www.edpsciences.org/articles/aa/pdf/2003/29/aah3929.pdf>  
This article presents the continuation of the successful search for near-1-second period waves in the solar corona, waves which have important implications for the non-intuitive heating of the solar corona. In data taken in a visible-light coronal emission line, during the total eclipse in Bulgaria in 1999, we find evidence of waves in the range 4-7 seconds in coronal loop structures, which helps assert that these potentially highly energetic waves do in fact exist.
- McGowan, K.E., J.A. Kennea, **S. Zane**, F.A. Córdova, **M. Cropper**, C. Ho, T. Sasseen, and W. T. Vestrand, Detection of Pulsed X-ray Emission from *XMM-Newton* Observations of PSR J0536+28172003, *Astrophysical Journal*, 591, 380-387, 2003.  
We detect X-rays from the pulsar for the first time (only 5% of radio pulsars are also seen to emit in X-rays). We find that the X-ray emission comes from a polar cap.
- Meredith, N.P.**, M. Cain, R.B. Horne, R.M. Thorne, D. Summers and R.R. Anderson, Evidence for chorus-driven electron acceleration to relativistic energies from a survey of geomagnetically disturbed periods, *JGR*, **108**(A6), 1248, doi:10.1029/2002JA009764, 2003.  
/home/npm/public\_html/papers/meredith\_JGR\_2003a.pdf  
We perform a survey of plasma wave and particle data from the CRRES satellite and show that significant relativistic electron flux enhancements are associated with periods of prolonged substorm activity, enhanced fluxes of seed electrons and enhanced lower-band chorus wave power. Our results are consistent with a local, chorus-driven electron acceleration mechanism involving the energization of a seed population of electrons with energies of the order of a few hundred keV to relativistic energies operating on a time-scale of days.
- Meredith, N.P.**, R. M. Thorne, R.B. Horne, D. Summers, B.J. Fraser and R.R. Anderson, Statistical analysis of relativistic electron energies for cyclotron resonance with EMIC waves observed on CRRES, *J. Geophys. Res.*, **108** (A6), 1250, doi:10.1029/2002JA009700, 2003.

[/home/npm/public\\_html/papers/meredith\\_JGR\\_2003b.pdf](/home/npm/public_html/papers/meredith_JGR_2003b.pdf)

We perform a statistical analysis of over 800 EMIC wave events observed on the CRRES spacecraft and show that scattering can occur at geophysically interesting energies ( $E < 2$  MeV) in localised regions of high plasma density and/or low magnetic field ( $f_{pe}/f_{ce} > 10$ ) for wave frequencies just below the hydrogen or helium ion gyrofrequencies. Our results show that drift-averaged scattering lifetimes will lie in the range of several hours to a day suggesting that EMIC waves should significantly effect relativistic electron dynamics during a magnetic storm.

**Meredith, N.P.**, R.B. Horne, R.M. Thorne, and R.R. Anderson, Favored regions for chorus-driven electron acceleration to relativistic energies in the Earth's outer radiation belt, *Geophys. Res. Lett.*, **30** (16), 1871, 10.1029/2003GL017698, 2003. [/home/npm/public\\_html/papers/Meredith\\_GRL\\_2003.pdf](/home/npm/public_html/papers/Meredith_GRL_2003.pdf)

Pitch angle and energy diffusion rates for scattering by whistler-mode chorus waves are proportional to the wave magnetic field intensity and are strongly dependent on the frequency distribution of the waves and the ratio  $f_{pe}/f_{ce}$ . We perform statistical studies of the CRRES wave data and show that, outside of the plasmopause, both  $f_{pe}/f_{ce}$  and lower-band chorus activity are dependent on magnetic activity with regions of low  $f_{pe}/f_{ce}$  and enhanced lower-band chorus activity occurring over a wide range of geospace during disturbed conditions ( $AE > 300$  nT).

O'Brien, T.P., K.R. Lorentzen, I.R. Mann, **N.P. Meredith**, J.B. Blake, J.F. Fennel, M.D. Looper, D.K. Milling, and R.R. Anderson, Energization of relativistic electrons in the presence of ULF power and MeV microbursts: Evidence for dual ULF and VLF acceleration, *J. Geophys. Res.*, **108**, (A8), 1329, doi:10.1029/2002JA009784, 2003.

[/home/npm/public\\_html/papers/o\\_brien\\_JGR\\_2003a.pdf](/home/npm/public_html/papers/o_brien_JGR_2003a.pdf)

We examine signatures of two types of waves that may be involved in the acceleration of energetic electrons in the Earth's outer radiation belt. We find that electron flux enhancements across the outer radiation belt are, in general, related to both ULF and VLF/ELF activity.

Planque, B., C.J.Fox, **M.A.Saunders** and **P.Rockett**, On the Prediction of Short Term Changes in the Recruitment of North Sea Cod (*Gadus Morhua*) Using Statistical Temperature Forecasts, *Scientia Marina*, **67** (Suppl. 1), 211-218, 2003.

<http://forecast.mssl.ucl.ac.uk/publ.html>

Stocks of North Sea Cod are inversely related to North Sea temperatures during spring. We show the potential for predicting these sea temperatures and thus cod stocks at leads of a few months.

**Qian, B.** and **M.A. Saunders**, Seasonal Predictability of Wintertime Storminess over the North Atlantic, *Geophysical Research Letters*, **30**(13), 1698, doi:10.1029/2003GL017401, 2003. (Highlighted by GRL).

<http://forecast.mssl.ucl.ac.uk/publ.html>

We find that winter storminess over large parts of the high latitude North Atlantic, including the North Sea and Scotland is linked significantly to the prior summer extent of northern hemisphere snow cover 1972/3-present. Our finding suggests that the seasonal predictability of winter storminess may be higher and extend to longer leads than thought previously.

**Ramsay, G., L. Harra, and H. Kay**, A search for X-ray variability in the open cluster NGC 2516, *MNRAS*, **341**, 1388, 2003.

A pilot study searching for variable X-ray objects using XMM-Newton data found 4 new flare stars in the open cluster NGC 2516. We compare their flare properties to solar flares.

Stevens, J., **M. Page** et al., The nature of X-ray selected extremely red objects *MNRAS*, **342**, 249, 2003.

We report on the X-ray, optical, near-infrared, submillimetre and radio properties of five extremely red objects selected at X-ray wavelengths by XMM-Newton. The data suggest they comprise a mixture of dusty starburst galaxies and non-dusty galaxies that are dominated by either starlight or light from an active nucleus.

Szego, K., Young, D.T., Barraclough, B., Berthelier, J-C., **Coates, A.J.**, McComas, D.J., Crary, F., Dougherty, M.K., Erdos, G., Gurnett, D.A., Kurth, W.S., Thomsen, M. F., Cassini plasma spectrometer measurements of Jovian bow shock structure, *J. Geophys. Res.*, **108**(A7), pp. SMP 11-1, CiteID 1287, DOI 10.1029/2002JA009517, 2003.

Analysis of data from 5 crossings of the Jovian bow shock, at up to 700 R<sub>J</sub> along the flank. Particle thermalisation is sometimes a better indication of the shock than field measurements.

Wild, J.A., S.E. Milan, S.W.H. Cowley, M.W. Dunlop, **C.J. Owen**, M.G. Taylor, J.A. Davies, M. Lester, N. Sato, A.S. Yukimatu, **A.N. Fazakerley**, and A. Balogh, Coordinated Inter-hemispheric SuperDARN Radar Observations of the Ionospheric Response to Flux Transfer Events Observed by the Cluster Spacecraft at the High-Latitude Magnetopause, *Ann. Geophys.*, **21**, 1807-1826, 2003.

On 14 February 2001, the 4 Cluster spacecraft observed characteristic field and particle signatures characteristic of magnetospheric flux transfer events (FTEs) both inside and outside of the magnetopause. The flow disturbances in the conjugate ionospheres and their consequences for the magnetic reconnection process at the magnetopause are discussed.

## **B. In Press**

Amm, O., Aikio, A., Bosqued, J.-M., Dunlop, M.W., **Fazakerley, A.N.**, Janhunen, P., Kauristie, K., Lester, M., Sillanpaa, I, **Taylor, M.G.G.T.**, Vontrat-Reberac, A., Mursula, K. and Andre, M., Mesoscale structure of a morning sector ionospheric shear flow region determined by conjugate Cluster II and MIRACLE ground-based observations, *Ann. Geophys.*, in press, 2003.

Andre, M., Vaivads, A., Buchert, S.C. and **Fazakerley, A.N.**, Thin electron scale layers at the magnetopause, *Geophys. Res. Lett.*, in press, 2003.

Behar, E., A. Rasmussen, **A.J. Blustin**, M. Sako, S.M. Kahn, J.S. Kaastra, **G. Branduardi-Raymont** and K. Steenbrugge, A long look at NGC 3783 with the XMM-Newton Reflection Grating Spectrometers, *Astrophysical Journal*, in press, 2003. <http://xxx.lanl.gov/abs/astro-ph/0307467>.

This paper attempts to derive the geometry and location of the X-ray emitting and absorbing outflow in the active galaxy NGC 3783, identifying with the extended ionisation cones observed directly in other active galaxies.

- Kataria, D.O.** and J.S.Lapington, An induced charge readout scheme incorporating image charge splitting on discrete pixels, *Nuclear Inst. and Methods in Physics Research*, in press, 2003.  
The paper describes a novel technique and a unique design for a microchannel plate anode readout, adapting the induced charge scheme for space plasma instrument applications.
- Matthews, S.A., L. van Driel-Gesztelyi,** H.S. Hudson and N.V. Nitta, A catalogue of white-light flares observed by Yohkoh, *Astronomy and Astrophysics*, in press, 2003. (<http://www.mssl.ucl.ac.uk/~sam/wlcat.ps.gz>)  
A comprehensive study of the characteristics of flares that produce white-light flares and those that don't, shows that white-light emission is strongly related to high coronal pressure, indicating these events have a substantial thermal component, contrary to popular belief.
- Smoker, J.V., W.R.J. Rolleston, **H.R.M. Kay,** D. Kilkenny, R. Morras, M. Arnal, F.P. Keenan, C.J. Mooney, P.L. Dufton, R.S.I. Ryans, N.C. Hambly, D. O'Donoghue, H. McGillivray, Ca II K interstellar observations towards early-type disc and halo stars, *MNRAS*, in press, 2003.  
Optical interstellar absorption in the Ca II K line has been widely used to study the structure and extent of gas in the interstellar medium. Here the interstellar absorption lines visible in the spectra of hot stars are used as tracers of intermediate and high velocity clouds in the Galactic disc and halo.
- Owen, C.J., M. Taylor, I.C. Krauklis, A.N. Fazakerley,** M.W. Dunlop, and J.-M. Bosque. Cluster observations of surface waves on the dawn flank magnetopause, *Ann. Geophys.*, in press, 2003.
- Qian, B. and M.A. Saunders,** Summer UK Temperatures and its Links to Preceding Eurasian Snow Cover, North Atlantic SST's and the NAO, *Journal of Climate*, in press, 2003. <http://forecast.mssl.ucl.ac.uk/publ.html>  
A significant link is found between late winter Eurasian snow cover and upcoming summer temperatures over the British Isles and adjacent areas. Significant links are also observed between summer temperatures and the preceding late winter NAO Index and a leading mode of North Atlantic sea temperature variability.
- Rousseau, A.,** Effect of relative humidity fluctuations on the rate of LVR/NVR deposition, Proceedings of 9th Annual Symposium for "Materials in a Space Environment", ESTEC, Holland, 16-20 June, 2003, in press, 2003.  
[http://www.mssl.ucl.ac.uk/www\\_cleanroom/adr\\_rhvshz\\_final.pdf](http://www.mssl.ucl.ac.uk/www_cleanroom/adr_rhvshz_final.pdf)  
The effect of Relative Humidity on Non Volatile Residue (NVR) deposition on critical spacecraft hardware during assembly, integration and test activities (I&T) is not well understood. This paper discusses data gathered in I&T facilities using a Surface Acoustic Wave (SAW) instrument capable of detecting mass accretion as small as  $0.2 \times 10^{-9}$  g/cm
- Starling, R.L.C.,** A. Siemiginowska, P. Uttley and **R. Soria,** Constraints on AGN accretion disk viscosity derived from continuum luminosity, *MNRAS*, in press, 2003. <http://xxx.soton.ac.uk/list/astro-ph/new>.  
We obtain limits on the alpha viscosity parameter for a sample of the PG quasars, assuming that their optical variability is caused by local instabilities in the inner accretion disk.
- Steenbrugge, K.C., J.S. Kaastra, **A.J. Blustin, G. Branduardi-Raymont,** M. Sako, E. Behar, S.M. Kahn, F.B.S. Paerels and R. Walter, Chandra LETGS and XMM-



Newton observations of NGC 4593, *Astronomy and Astrophysics*, in press, 2003. <http://xxx.lanl.gov/abs/astro-ph/0306336>

The paper reports the detection of narrow X-ray absorption lines from ionised gas flowing out of the nucleus of the active galaxy NGC 4593. This gas is found to have two separate ionisation phases, one much more highly ionised than the other.

Wild, J.A., Milan, S.E., **Owen, C.J.**, Bosqued, J.-M., Lester, M., Wright, D.M., Frey, H., Carlson, C.W., **Fazakerley, A.N.**, and Reme, H., On the determination of the open-closed magnetic field line boundary location in the dusk sector auroral ionosphere: global auroral imaging, coherent scatter radar and energetic particle observations, *Ann. Geophys.*, in press, 2003.

Young, D.T., Berthelier, J.-J., Blanc, M., Burch, J.L., **Coates, A.J.**, Goldstein, R., Grande, M., Hill, T.W., Jonson, R.E., Kelha, V., McComas, D.J., Sittler, B.C., Svenes, K.R., Szego, K., Tanskanen, P., Ahola, K., Anderson, D., Bakshi, S., Baragiola, R.A., Barraclough, B.L., Black, R., Bolton, S., Booker, T., Bowman, R., Casey, P., Dirks, G., Eaker, N., Gosling, J.T., Hannula, H., Holmlund, C., Huomo, H., Illiano, J.-M. and **Linder, D.R.**, Cassini Plasma Spectrometer Investigation, *Space Sci. Rev.*, in press, 2003.

## **Publications – Non-Refereed**

### **A. Published**

**Saunders, M.A.**, and **A. Lea**, June, July and August monthly forecast updates for: (1) Atlantic and US landfalling hurricane activity in 2003, (2) Northwest Pacific typhoon activity in 2003, (3) Australian-region tropical storm activity in 2003/4. 9 forecast documents available from [www.tropicalstormrisk.com](http://www.tropicalstormrisk.com).

**Yershov, V.N.**, Topology of space at sub-quark level and masses of quarks and leptons, in *Geometrical and Topological Ideas in Modern Physics: Proceedings of the XXV Workshop on the Fundamental Problems of High Energy Physics*, Protvino (Russia) June 25-29, 2002, ed. A.V.Petrov, IHEP 2003, pp.130-139. <http://dbserv.ihep.su/~pubs/tconf02/c02-25-e.htm>

### **B. In Press**

Barabash, S., Lundin, R., Andersson, H., Gimholt, J., Holmstrom, M., Norberg, O., Yamauchi, M., Asamura, K., **Coates, A.J.**, **Linder, D.R.**, **Kataria, D.O.**, Curtis, C.C., Hsieh, K.C., Sandel, B.R., Fedorov, A., Grigoriev, A., Budnik, E., Grande, M., Carter, M., Reading, D.H., Koskinen, H., Kallio, E., Riihela, P., Sales, T., Kozyra, J., Krupp, N., Livi, S., Woch, J., Luhmann, J., McKenna-Lawlor, S., Orsini, S., Cerulli-Irelli, R., Mura, A., Milillo, A., Roelof, E., Williams, D., Sauvaud, J.-A., Thocaven, J.-J., Winningham, D., Frahm, R., Scherrer, J., Sharber, J., Wurz, P. & Bochsler, P., ASPERA-3: Analyser of space plasmas and energetic ions for Mars Express mission, in press, 2003.

**Bogdanova, Y.V.**, Klecker, B., Paschmann, G., Kistler, L.M., Mouikis, C., Moebius, E., Reme, H., Bosqued, J.M., Dandouras, I., Sauvaud, J.A., Cornilleau-Wehrlin, N., Laakso, H., Korth, A., Bavassano-Cattaneo, M.B., Phan, T., Carlson, C., Parks, G., McFadden, J.P., McCarthy, M. & Lundin, R.,

- Investigation of the source region of ionospheric oxygen outflow in the cusp using multi-spacecraft observations by CIS onboard Cluster, *Adv. Space Res.*, in press, 2003.
- Coates, A.J.**, Ion pickup at comets, *Adv. Space Res.*, in press, 2003.
- Coates, A.J., Crosby, N.B., Linder, D.R. and Kataria, D.O.**, Space weather studies for the satellite insurance industry, in press, 2003.
- Fraenz, M., Horbury, T.S., Genot, V., Moullard, O., Reme, H., Dandouras, I., **Fazakerley, A.N.**, Korth, A. & Frutos-Alfaro, F., Solitary waves observed by Cluster in the solar wind, in *Proc. Solar Wind 10*, in press, 2003.
- Hancock, B.**, and H. Kawakami, UVOT Bright Source Safing System, *Proceedings of the SPIE Conference*, San Diego, USA, 4<sup>th</sup> August 2003, in press.  
<http://mssl7.mssl.ucl.ac.uk/swift/docs/516530b.pdf>  
 Describes the hardware that protects the UVOT against the potentially damaging effects of observing bright sources.
- Huckle, H.E. and P.J. Smith**, UVOT Autonomous Operations, *Proceedings of the SPIE Conference*, San Diego, USA, 4<sup>th</sup> August 2003, in press.  
<http://mssl7.mssl.ucl.ac.uk/swift/docs/SPIE-final.pdf>  
 Describes the on-board virtual-CPU based software that provides autonomous control of exposures and maintains the health and safety of the instrument.
- Iles, R.H.A.**, Jones, J.B.L., **Bentley, R.D.**, **Hunter, R.**, Taylor, G.C., **Thomas, D.J.**, **Harra, L.K.** and **Coates, A.J.**, The effect of solar particle events at aircraft altitudes, in ESA Space Weather Conference, in press, 2003.
- Mason, K.O.** et al., Performance of the UV/Optical telescope (UVOT) on Swift, *Proceedings of the SPIE Conference*, San Diego, USA, 4<sup>th</sup> August 2003, in press.
- Schwartz, S.J., Paschmann, G., Skopke, N., Bauer, T.M., Dunlop, M.W., **Fazakerley, A.N.** and Thomsen, M., Hot flow anomalies at the Earth's bow shock, in *Proc. of the 5th European Workshop on Collisionless Shocks*, Velizy, France, in press, 2003.
- Trotignon, J.G., Balogh, A., Bostrum, R., Burch, J.L., Carr, C., **Coates, A.J.**, Gille, P., Gimholt, J., Glassmeier, K.H., Lundin, R., Musmann, G. & Szego, K., ESA SP On Rosetta Mission, in press 2003.

### **Teaching Developments**

*New MSc in Geophysical Hazards.* The Department will be contributing 50 lectures and project supervision to the new MSc in Geophysical Hazards starting in September 2003. Our lectures will be on "Meteorological Hazards and Space Weather" and "Modelling of Climate". The MSc is being run by the Earth Sciences Department at UCL and is a 'first' in the UK. Our teaching will be carried out by Ian Mason, Mark Saunders, Andrew Coates and Louise Harra.

*Project Management Course.* Matthew Whyndham and Alan Smith are among the tutors of the successful and established professional project management course for industry (run by the UCL management studies centre in conjunction with the APM). In October 2003 the course will be delivered to staff of Tubelines (one of the

London Underground operating companies). The course is also being developed and customised for other corporate and educational clients.

*MSc in Space Sciences*. This year the group project was on a sample return mission 'Endymion' to the Moon, supervised by Andrew Fazakerley. The project was well received by reviewers from industry and academia.

### **Invited Presentations (National and International)**

Coates, A.J., The plasma environment of satellites: real and artificial, Open University, seminar, 5 June 2003.

Coates, A.J., The future of space travel (part of a debate), Cheltenham Science Festival, 8 June 2003.

Owen, C.J., Observations at the dayside magnetopause during the first 2 years of the Cluster mission', in session GAIII.04, 'What are the structures and dynamics of the magnetopause and its boundary layers?', International Union of Geodesy and Geophysics/International Association of Geomagnetism and Aeronomy General Assembly, Sapporo, Japan, July 2003.

Owen, C.J., Cluster observations at different scale lengths – what can we learn about the reconnection process?, in session GAIII.12, 'How does multi-point monitoring probe multiple spatial and temporal scales in the magnetosphere?', International Union of Geodesy and Geophysics/International Association of Geomagnetism and Aeronomy General Assembly, Sapporo, Japan, July 2003.

Coates, A.J., UK goes to the planets, British Festival of Space, Surrey University, 12 July 2003.

Coates, A.J., Exploring the solar system, London International Youth Science Forum, Institution of Electrical Engineers, 28 July 2003.

van Driel-Gesztelyi, L., Emergence and loss of magnetic flux on the solar surface, JENAM-2003, Minisymposium on Active Stars and Interacting Binaries, Budapest, Hungary, 25-30 August 2003.

### **Conference and Workshop Presentations (National and International)**

9<sup>th</sup> Annual Symposium on Materials in a Space Environment, ESTEC, Netherlands, 16-20 June 2003. Paper presented by Alex Rousseau.

International Symposium on Shallow Flows, Delft, Netherlands, 16-18 June 2003. Paper presented by Andrew Orr.

ECMWF Seasonal Forecast Users Meeting, Reading, 18-19 June 2003. Paper presented by Mark Saunders.

Union of Geodesy and Geophysics/International Association of Geomagnetism and Aeronomy General Assembly, Sapporo, Japan, July 2003. Papers presented by Yulia Bogdanova and Chris Owen.

IAU General Assembly, Sydney, Australia, 21-25 July 2003. Papers presented by Louise Harra and Lidia van Driel-Gesztelyi.

SPIE Conference, San Diego, USA, 4 August 2003. Papers presented by Keith Mason, Barry Hancock and Howard Huckle.

ASPERA team meeting, IRF-Kiruna, Sweden, 20-22 August 2003. Presentations by Andrew Coates and Dhiren Kataria.

AGU Chapman Conference on the Physics and Modelling of the Inner Magnetosphere in Helsinki, Finland (24-29 August, 2003). Paper presented by Nigel Meredith.

Summer School and Workshop: Solar magnetic Phenomena, Kanzelhöhe Observatory, Austria, 25 August - 7 September 2003. Lecture presented by Lidia van Driel-Gesztelyi.

### **Media Broadcasts and Features**

Andrew Coates (selection of ~20 national and local media pieces):

Sky News, on Mars Express and Beagle 2 launch, 1 June 2003.

ITN News Channel, on Mars Express and Beagle 2 launch, 1 June 2003.

The World, BBC/WGBH radio Boston, on Mars Express and Beagle 2, 2 June 2003.

Radio 4 PM programme, on Mars Express/Beagle 2 launch, 2 June 2003.

BBC R4, The Material World, on space travel, 5 June 2003,

BBC R4 Today programme, on space tourism, 18 July 2003.

Daily Telegraph, on implications of Columbia disaster, 6 August 2003.

The Times, on Hubble Space Telescope repair options, 16 August 2003.

Sky News, on SMART-1 mission, 18 August 2003.

ITN News Channel, on Brazilian rocket explosion, 22 August 2003.

Mark Saunders:

Insurance Day, Free online tropical storm tracker launched, 3 June 2003.

Post Magazine, TSR aids reinsurers storm predictions, 5 June 2003.

Reactions Financial Magazine, Hurricane predictions – countdown to landfall, (Feature article), July 2003 issue, pp 31-33. [www.reactionsnet.com](http://www.reactionsnet.com)

### **Proposals Submitted**

*Solving Magnetospheric Acceleration, Reconnection and Turbulence (SMART)*. Submitted in response to NASA AO for Magnetospheric MultiScale mission. Andrew Coates and Andrew Fazakerley are scientific Co-Investigators. MSSL's role

would be to provide fast electron analysers. Selection for Phase A study is expected in September/ October 2003.

*North Atlantic Extra-Tropical Storm Tracker.* Proposal for real-time internet application to increase risk awareness, forecast loss and generate subscription revenue. Submitted to the insurance and risk management industries. Mark Saunders PI.

*Tropical Storm Risk.* Proposals submitted to the Catastrophe Modelling Companies AIR (Applied Insurance Research) and EQECAT to co-sponsor and extend the TSR (Tropical Storm Risk) venture into business product development. Mark Saunders PI.

*WAP-QA Service Continuation for 2004.* This service provides quality assessment for the ERS Radar Altimeter data products from the UK-PAF. Even though the ERS-2 science mission has ended data reprocessing is expected to continue for at least another year. Submitted to Infoterra Ltd. Steven Baker PI.

### **Other News Items/Activities**

1. News Story in Science. The paper: Saunders, M.A., B. Qian and B. Lloyd-Hughes, Summer Snow Extent Herald of the Winter North Atlantic Oscillation, *Geophys. Res. Lett.*, 30(7), 1378, doi:10. 1029/2002GL016832, 2003 reported in Vol.1 Issue 1 of the Newsletter was the subject of a News Story in *Science* on 20<sup>th</sup> June:

Kerr, R.A., WEATHER FORECASTING: Can Northern Snow Foretell Next Winter's Weather?, *Science*, **300**, 1865-1866, 2003.

<http://www.sciencemag.org/cgi/content/summary/300/5627/1865?etoc>

2. Stand at Royal Society Summer Exhibition. Andrew Coates and Andrew Griffiths assisted on the stand for the exhibit 'Mars, Life and Beagle 2' at the Royal Society summer exhibition, 1-3 July 2003.

3. British Festival of Space. With thanks especially to Judy Bartley, Martin de la Nougerede, Tracey Poole, Rhaana Starling and Andrew Coates, the Department had a significant and successful presence (stand, talks and demonstrations) at the British Festival of Space, University of Surrey, 10-12 July, 2003.

4. Cumberland Lodge Meeting. Our Department staff had a worthwhile 2.5 day meeting with UCL Physics and Astronomy Department staff at Cumberland Lodge, Windsor, 14-16 July 2003. The aim was to enhance co-operation and joint research between the Departments. Co-organised by Mark Cropper.

5. MSSL Hosts Student Visits. MSSL hosted visits from groups of students from the Delft University of Technology (30 June) and from the London International Youth Science Forum (29 July).

## **Acknowledgements**

Venus Express - Thank you to everyone involved in the Venus Express calibration and UV tests. (Space Plasma and Planetary Physics Group).

Cassini and Beagle 2 - Thanks to Jo Sullivan for all her hard work. (Space Plasma and Planetary Physics Group).

Double Star - Thanks to all involved in preparations at MSSL and in China. (Space Plasma and Planetary Physics Group).

## **Next Issue**

The next issue of the Department of Space and Climate Physics Newsletter (Volume 1, Issue 3) will be in mid December 2003. This will cover activities from 1<sup>st</sup> September 2003 to 30th November 2003.