



The Newsletter - Volume 6, Issue 3

21st January 2009

Covers events between 1st September 2008 and 30th November 2008

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General

Professor Janusz Sylwester, Head of the Space Research Centre, Wroclaw, Poland, and a frequent visitor to MSSL on collaborative ventures (most recently RESIK and SphinX) has been made an Honorary Fellow of the Royal Astronomical Society.

New Staff Members

We are pleased to welcome:

Jo Bartlett (Cryogenics)

Vitor Botelho (Electronics)

Drs. Peter Curren, Daisuke Kawata and Sugata Kaviraj (Astrophysics)

Colin Forsyth and Chuan Li (Plasma Physics)

Dongjoe Shin (Imaging)

Visitors

Dr Anasuya Aruliah - from the Atmospheric Physics Laboratory, Physics and Astronomy, UCL is taking a sabbatical at MSSL and will be visiting us most Thursdays and Fridays.

Nick Wardle, a Nuffield and RAS summer student from the University of Warwick and Dom Walton, an RAS summer student from the University of Durham, worked under the supervision of Claire Foullon on 'Periodicities in the Solar Wind'.

Dr Ondrej Santolik from the Institute of Atmospheric Physics and Charles University (Prague, Czech Republic), visited the Plasma Group for collaborative work (14-16 Oct.) and, as part of the Plasma Group Seminar Series, gave a seminar on "Observations of chorus and equatorial noise emissions" (14 Oct.).

Many international visitors attended the PEACE team meeting hosted at MSSL (17-19 Nov.).

Prizes and Awards

MSSL prize-giving was held on 27 November. Andrew Walsh won the Alan Jonstone Award for outstanding scientific achievement by a research student; Lucy Green won the Elizabeth Puchnarewicz Award for her outstanding contribution to public outreach; John Coker received the John Raymont Award for outstanding commitment to MSSL's technology programme and Curtis Saxton was awarded the Robert Boyd Award for outstanding scientific achievement.



Pictured are Curtis and John who received their awards from Alan Smith.

Andrew Walsh was awarded an RAS Grant, as well as support from STFC and UCL, to spend 3 months (Sept -Dec 08) at the University of Alberta, Canada, collaborating with Prof I. Mann and Dr J. Rae. His work there focussed on investigating the relationship between ground magnetometer and spacecraft data during substorms, and in particular what magnetospheric phenomenon causes Pi1 and Pi2 pulsations.

Sheila Kanani was awarded UCL Graduate Funding to attend the Cassini CAPS Team Meeting in Santa Fe, New Mexico.

Appointments (e.g. Editorial Boards or Committees)

From November 2008, Roberto Mignani has officially joined the Fermi-LAT collaboration as affiliated scientist. The NASA Fermi Gamma-ray Space Telescope, launched in June 2008, is the most advanced mission for gamma-ray astronomy to date and the LAT instrument on-board FERMI will discover several thousands of new gamma-ray sources. Roberto joins the Fermi-LAT collaboration to participate in multi-wavelength follow-ups of unidentified gamma-ray sources.

Proposals

MSSL is in negotiation with Vega (UK) to provide expert support to Altimetry Missions from 2009 (Steve Baker).

Grants and Contracts Awarded

Phil Guttridge was awarded a Knowledge Transfer Partnership with the Real Time Data Company earlier this year. This is a two-year project worth over £140,000.

Telescope/Satellite Time Awards

Roberto Soria:

- 4 days at the Australia Telescope Compact Array (Narrabri, NSW), on Dec 30-Jan 2 to study the radio jet and lobe evolution in a microquasar near the Galactic Centre.
- PI for a submitted XMM-Newton proposal to study the radiation properties and accretion states of a microquasar near the Galactic Centre, for which he has already obtained time on a radio telescope this year.
- PI for a submitted XMM-Newton proposal to study a transient supersoft source in the galaxy NGC4631, and determine whether the compact object is a nuclear-burning white dwarf with Nova-like outbursts, or a super-Eddington accreting black hole with outflows.
- Co-I for an XMM-Newton proposal to study the short-term variability of the active nucleus of NGC1365, which may be caused by orbiting clouds (PI: Guido Risaliti).
- Co-I for a submitted Swift proposal to study the spectral evolution of the two brightest ULXs (in the M81 group).

Nick Seymour:

- 20 hours on the IRAM 30m telescope.

Mission Status and Developments

Cassini - Instrument is still performing well and Cassini is now in its extended “equinox” mission at Saturn. Many publications and presentations in this period.

Cluster - The PEACE instruments on all four Cluster spacecraft are functioning well and collecting data. Iryna Rozum participated in the 8th Cluster Active Archive Cross-Calibration meeting in October, in Kinsale, Ireland. Andrew Fazakerley and Iryna attended the latest Science Operations Working Group meeting in Paris in November, and contributed to a heated debate on how best to deploy the spacecraft in the current disruption region in the 2009 tail season. The Cluster Active Archive core team made a routine visit to MSSL in November to discuss progress of PEACE archiving.

Cosmic Visions - Outer planets mission – currently two missions are under study (TSSM and EJSM). Graziella Branduardi-Raymont and Andrew Coates attended the STFC PPRP meeting in Armagh on 27 October to answer questions on our instrumentation proposals.

Cross-Scale - Members of the laboratory are engaged with a number of activities on Cross-Scale as part of the assessment phase for Cosmic Visions. Chris Owen attended a meeting of the ESA Science Study Team (30-31 Oct.) which was briefed on the status of the industrial studies of the mission architecture. Andrew Fazakerley is leading a consortium of institutes studying the electron instrumentation required for the mission. We continue to await news from STFC on the outcome of our funding application for these studies. Work on instrument design for Cross-Scale continued (at MSSL) at a low level.

Double Star - TC-2 continues to operate only on a seasonal basis, due to power problems associated with an uncontrolled spin-axis tilt away from the preferred north-south alignment. Operations are expected to become impossible at some point in 2009 due to inadequate power availability from the aging solar panels. Andrew Fazakerley attended an SWT in Beijing in September.

ExoMars - Major activity in this period was the preparations (including documentation, presentations and hardware) for, and attendance and presentations at, the PanCam Preliminary Design Review, held at MSSL on 29-31 October. This included the WALI (Wide Angle Laser Imaging) addition. The PanCam interface unit (PIU) has been demonstrated to work with the High Resolution Camera and the WAC filter wheel. A mast meeting was also held at DLR (Berlin) on 1 October and it was clarified soon after this that MSSL will assume responsibility for the PanCam Optical Bench – the mechanical interface to the PanCam mast. The ExoMars launch date has now slipped by 26 months to Jan./Feb. 2016.

Kua-fu - Andrew Fazakerley attended the Third International KuaFu Symposium in Kunming, China in September. The meeting combined discussions on the mission design and progress towards approval, with presentations of relevant hot science topics and advances that KuaFu could be expected to bring in these areas. Andrew presented both a poster on Sun-Earth Connection work at MSSL, and an invited talk on the results of a mission design study based largely on a UCL MSc Group Project aimed at assessing how to deliver KuaFu science goals sooner and at lower cost than currently envisaged. As well as being a good advertisement for UCL/MSSL, the design study was very topical as it addressed one of the key issues discussed by the project team during the meeting.

Solar Orbiter - The ESA Solar Orbiter program appears now to be delayed and to have moved back into the Cosmic Visions competition as an 'M' Class candidate. We continue to discuss various aspects of our proposed PI-role in the SWA consortium as part of the definition phase of the mission. Discussions continue with STFC regarding the level of funding for the definition phase activities given the new timeline for the mission.

Venus Express - Instrument performing well. Calibration report for ELS delivered. Team meeting on 26-28 Nov in Kiruna. Presentations were made on operations and science for ELS on our behalf.

Publications - Refereed

A. Published

- Achilleos, N., ARRIDGE, C.S., Bertucci, C., Jackman, C.M., Dougherty, M.K., Khurana, K.K., Russell, C.T., Crary, F.J. & Young, D.T., Large-scale dynamics of Saturn's magnetopause: observations by Cassini, *J. Geophys. Res.*, **113**, 11209, 2008. [10.1029/2008JA013265](https://doi.org/10.1029/2008JA013265)
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- Cowley, S.W.H., ARRIDGE, C.S., Bunce, E.J., Clarke, J.T., COATES, A.J., Dougherty, M.K., Gerard, J.-C., Grodent, D., Nichols, J.D. & Talboys, D.L., Auroral current systems in Saturn's magnetosphere: Comparison of theoretical models with Cassini and HST observations, *Ann. Geophysicae*, **26**, 2613-2630, 2008.
- Dubinini, E.M., Fraenz, M., Woch, J., Roussos, E., Winningham, J.D., Frahm, R.A., COATES, A., Leblanc, F., Lundin, R. & Barabash, S., Access of solar wind electrons into the Martian magnetosphere, *Ann. Geophysicae*, **26**, 3511-3524, 2008.
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- Graps, A.L., JONES, G.H., Juhasz, A., Horanyi, M. & Havnes, O., The Charging of Planetary Rings, *Space Sci. Rev.*, **137**, 435-453, 2008.
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- Jackman, C.M., ARRIDGE, C.S., Krupp, N., Bunce, E.J., Mitchell, D.G., Murth, W.S., McAndrews, H.J., Dougherty, M.K., Russell, C.T., Achilleos, N., COATES, A.J. & JONES, G.H., A multi-instrument view of tail reconnection at Saturn, *J. Geophys. Res.*, **113**, A11,, 2008.
- Juusola, L., Amm, O., Frey, H.U., Kauristie, K., Nakamura, R., OWEN, C.J., Sergeev, V., Slavin, J.A. & Walsh, A., Ionospheric signatures during a magnetospheric flux rope event, *Ann. Geophysicae.*, **26**, 3967-3977, 2008.
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- YERSHOV, V.N., Renormalization of chromoelectric fields in a two-component preon system, *International Review of Physics*, **2**, 4, 253-258, 2009.

B. In Press

- COATES, A.J., Interaction of Titan's ionosphere with Saturn's magnetosphere, *Phil. Trans. Roy. Soc.*, 2008.
- Cravens, T.E., Robertson, I.P., Waite Jr, J.H., Yelle, R.V., Vuitton, V., COATES, A.J., Wahlund, J.-E., Agren, K., Richard, M.S., De La Haye, V., WELLBROCK, A. & Neubauer, F.M., Model-Data comparisons for Titan's Nightside Ionosphere, *ICARUS*, 2008.
- Fender, R.P., Russell, D.M., Knigge, C., SORIA, R., Hynes, R.I. & Goad, M., An anti-correlation between X-ray luminosity and H-alpha equivalent width in X-ray binaries, *Mon. Not. R. astr. Soc.*, 2009.
- Khurana, K.K., Mitchell, D.G., ARRIDGE, C.S., Dougherty, M.K., Russell, C.T., Paranicas, C.P., Krupp, N. & COATES, A.J., Sources of rotational signals in Saturn's magnetosphere, *J. Geophys. Res.*, 2009.
- MURRAY, M.J., VAN DRIEL-GESZTELYI, L. & BAKER, D., Simulations of emerging flux in coronal holes: oscillatory reconnection, *Astron. & Astrophys.*, 2009. Using numerical simulations to model flux emerging through the surface of the Sun we discovered the phenomenon of oscillatory reconnection, whereby reconnection occurs in distinct bursts and the inflow and outflow magnetic fields of one burst of reconnection become the outflow and inflow fields in the following burst of reconnection, respectively. Previously thought not to be possible, reconnection under this mechanism shows periodic and damping signatures which compare favourably with emission measures of solar and stellar flares.
- Provan, G., Andrews, D.J., ARRIDGE, C.S., COATES, A.J., Cowley, S.W.H., Milan, S.E., Dougherty, M.K. & Wright, D.M., Polarization and phase of planetary period oscillations on high latitude field lines in Saturn's magnetosphere, *J. Geophys. Res.*, 2008.
- Risaliti, G., Salvati, M., Elvis, M., Fabiano, G., Baldi, A., Bianchi, S., Braitto, V., Guainazzi, M., Matt, G., Miniutti, G., Reeves, J., SORIA, R. & Zezas, A., The XMM-Newton long look of NGC 1365: uncovering of the obscured X-ray source, *Mon. Not. R. astr. Soc.*, 2009.
- Szego, K., Bebesi, Z., Dobe, Z., Fraenz, M., Fedorov, A., Barabash, S., COATES, A.J. & Zhang, T.L., The O⁺ ion flow below the magnetic barrier at Venus post terminator, *J. Geophys. Res.*, 2008.

Publications - Non-refereed

A. In Press

- SORIA, R., Perna, R., Pooley, D. & Stella, L., How rapidly do neutron stars spin at birth? in Proceedings of the 10th Asia-Pacific Regional IAU meeting (APRIM 2008), 2008.

PhDs awarded

Yasir Soobiah and Jo Bartlett successfully defended their theses.

Invited Talks and Conferences

Carlos Allende Prieto:

- "Stellar Atmospheric Parameters: The Four-Step Program and Gaia's Radial Velocity Spectrometer, Classification and Discovery in Large Astronomical Surveys", Ringberg Castle (Tegernsee), Germany.
- "Upcoming Spectroscopic Surveys of Galactic Stars", Dublin Institute for Advanced Studies, Dublin, Ireland.

Andrew Coates:

- "Observations of turbulence generation near comets", invited presentation at 2nd International Heliospheric Year conference, ISSI, Bern, 10-13 Nov.
- "Heavy Negative Ions: Tholins in Titan's Haze", presentation, Cassini-Huygens Analysis and Results from the Mission (CHARM), 28 Oct.

Andrew Coates, Gethyn Lewis and Sheila Kanani attended the CAPS Team meeting in Santa Fe 17-19 Nov. First-author talks by Gethyn Lewis, Andrew Coates, Annie Wellbrock and Geraint Jones were presented with MSSL co-authorship on a number of other talks:

- Coates, A.J., Negative ions at Titan and Enceladus.

- Wellbrock, A., A. J. Coates, I. Sillanpää, Y. J. Ma, T. E. Cravens, G.H. Jones, G.R. Lewis, F. J. Crary, D. T. Young, Observations of ionospheric photoelectrons at Titan with CAPS ELS: T40, T15, T17.
- Jones, G.H., C.S. Arridge, A.J. Coates, S. Kanani, D.T. Young and F.J. Crary, High-energy ELS signatures in the Enceladus plume.
- Kanani, S., G.H. Jones, E. Roussos, Low energy spikes in the wakes of Saturn's icy moons.
- Lewis, G.R., CAPS-ELS Status Report.

Andrew Fazakerley:

- Invited talk at the Third International KuaFu Symposium in Kunming, China in September.

Claire Foullon

- Invited talk on "Evolution of Kelvin-Helmholtz Activity on the Dusk Flank Magnetopause", at the AMDA Workshop on Magnetosheath Processes, CESR, Toulouse, France

Sandrine Grimald

- Invited seminar concerning her work on Non-Thermal Continuum radiation at CFSA, Warwick University.

Geraint Jones spoke at the RAS Discussion Meeting "Comets after Stardust"

- Jones, G. H., et al., Dust, Neutrals, and Ions in a Near-Sun Comet: Observations of C/2006 P1 (McNaught).

Sheila Kanani presented a talk at the UK Planetary Forum Early Careers meeting at UCL (3 Nov.)

- Kanani, S., G.H. Jones, E. Roussos, Electron microsignature at Saturn's icy moons.

Bernhard Kleim:

- NASA Goddard Space Flight Center, Greenbelt, MD, USA, Heliophysics Seminar, "Flux rope instabilities at the onset of coronal mass ejections".
- George Mason University, Fairfax, VA, USA, Space Physics Seminar, "Flux rope instabilities at the onset of coronal mass ejections".
- AGU Fall Meeting, San Francisco, CA, USA, 15-19 Dec. Invited Talk: "Magnetic twist, writhe, and helicity at CME onset, and their initial evolution".

Gethyn Lewis presented a paper at European Planetary Science Congress (EPSC) in Munster; the Planetary Group participated in 6 other papers. Sept.

- Lewis, G.R., Arridge, C.S., Coates, A.J., Andre, N., Electron moments determination in negative spacecraft potential regions.

Michelle Murray gave a talk at Flux Emergence Workshop 2008, Kyoto, Japan entitled, "Simulations of emerging flux in coronal holes: oscillatory reconnection".

Nicole Schmitz (DLR) represented PanCam team at ASTRA 2008 (ESTEC)

- Schmitz, N; Griffiths, A; Barnes, D; Coates, A; Michaelis, H; Jaumann, R; Hauber, E; Trauthan, F, ExoMars PanCam Field Test Report from the Arctic Mars Analogue Svalbard Expedition (AMASE) 2008, presented at 10th Workshop on Advanced Space Technologies for Robotics and Automation – ASTRA 2008, ESTEC, 11-13 Nov.

Roberto Soria:

- Shanghai Observatory from 1-5 September and gave a seminar on the birth parameters of pulsars. He also visited Tsinghu University (Beijing) on 5-30 September and gave a seminar on black hole accretion states, as well as collaborating with Prof SON Zhang and his students.

Annie Wellbrock presented a talk at the RAS MIST meeting. The Planetary Group was also involved in one other presentation:

- A. Wellbrock, A.J. Coates, G.R. Lewis, G.H. Jones, C.S. Arridge, A. D. Aylward, F. J. Crary, D.T. Young, Observations of photoelectrons near Titan with the Cassini CAPS electron Spectrometer, presented at RAS MIST meeting, London, 28 Nov.

Media Broadcasts and Features

Andrew Coates:

Interviews:

- BBC News Channel on CERN LHC switch on (mentioned Saturn, Venus, Mars also), 10 Sept BBC R4 Today programme on China in space, 25 Sept.
- Channel 4 News on China in space, 27 Sept.
- BBC News Online, ExoMars launch delay, 17 Oct.
- Chandrayaan 1 and international space exploration (including Cassini), BBC World and News Channel, 22 Oct.

- BBC World, BBC News Channel and BBC News online, on ISS anniversary (mentioned Cassini also), 20 Nov.
- Info for New Scientist online on Titan's magnetic memory, 11 Sept.

Outreach

Andrew Coates:

- Lecture for UCL Science Centre, on 'What can Venus, Mars and Titan tell us about Earth', 7 Nov.

Chris Arridge:

- Attended Nuffield Science Foundation awards evening at Esher College for Nuffield summer student Tim Culwick who worked on a Cassini project during July/Aug.
- Started a new school year as Researcher in Residence at Willingdon Community School, Eastbourne.

Other News Items/Activities

Thanks to everyone involved in the ExoMars Pan Cam PDR – this was a major effort.

Giulio del Zanna and Ken Phillips attended the SphinX workshop at the Space Research Centre, Wroclaw, Poland, 1-6 Sept. This was attended by SphinX Co-I's from Wroclaw, Ondrejov (Czech Rep.) and NASA/GSFC. SphinX, a solar soft X-ray spectrophotometer with broad-band resolution in the 0.8-14.5 keV range, will be launched on the Russian CORONAS-Photon spacecraft on Jan. 29, 2009.

Bernhard Kliem has been working as a visiting scientist at the Naval Research Laboratory, Washington, DC, USA, 20 Oct. - 30 Nov.

Next Issue

The next issue of The Newsletter (Volume 6, Issue 4) will be published in March 2008. This will cover activities from 1 December 2008 to 28 February 2009.