

**UCL – DEPARTMENT OF SPACE AND CLIMATE PHYSICS
MULLARD SPACE SCIENCE LABORATORY**

**The Newsletter
Volume 4, Issue 2
3 October 2006**

Covers events between 1st June and 31st August 2006

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The launch of HINODE (formerly Solar-B) from the Uchinoura Space Center, Japan. It carries the EUV imaging spectrometer (EIS) which was built by a consortium lead by MSSL. Picture courtesy of ISAS, Japan.

General

Congratulations go to Paul Addison and Berend Winter both of whom have had baby sons and to Giulio del Zanna who has had a baby daughter.

We welcome five new PhD students to MSSL. They are Deb Baker (Solar), Jennifer Barnes (Climate Extremes), Kimberley Steed (Plasma/Solar), Laura Pickard (Theory) and Dave Vande Putte (Astrophysics).

Visitors

Space Plasma Physics Group:

- Renyu Hu (Ecole Centrale Paris, France), the Dean's summer student, worked in the Group from 1 July-25 August, supervised by Chris Owen, Yulia Bogdanova and Claire Foullon.
- Dr. Yoshihiro Asano (Tokyo Institute of Technology) visited for two weeks at the end of June, to work on Cluster data analysis. He gave a seminar entitled, 'Current sheet structure in the magnetotail associated with magnetic reconnection and substorms'.
- Prof. Stanley Cowley (University of Leicester). He gave a seminar on, 'Solar wind-magnetosphere-ionosphere coupling at Jupiter and Saturn'.
- Dr Aurelie Marchaudon (CNRS, France) visited for one week at the beginning of August to work on Cluster data analysis.

Planetary Science Group:

- Grace Thomson, summer student, working with Andrew Coates and Yasir Soobiah on Venus Express data analysis
- Thomas Aumeyr, summer intern student, working with Andrew Griffiths on the Hyperspectral Stereo Camera project.
- Andrei Federov, CESR, visited to discuss Mars Express data and give a seminar on Mars escape processes, 9 August.

Appointments

Andrew Coates - Royal Society Phil Trans A Editorial Board - extended to the end of 2009.

Sarah Matthews is the UK representative on the newly-formed European Association for Solar Telescopes (EAST).

Prizes and Awards

The Department's Tropical Storm Risk forecasting venture won the prestigious British Insurance Award for Risk Management at a gala ceremony at the Royal Albert Hall. See page 3 for further details.

Mission Status and Developments

Aurora/ExoMars - interface meeting with AAS-I, 6 June, stereo team meeting 7 June UCL.

Cassini-Huygens - 14-16 June MAPS workshop, Imperial College. 11 August MAG/CAPS Titan meeting, Imperial.

Cross-Scale - The mission concept was presented to the PPARC Cosmic Visions Panel Meeting on July 25.

Jupiter/Europa Orbiter (cosmic visions candidate) - Alan Smith, Graziella Branduardi-Raymont and Andrew Coates, contributed to the community meeting presentation in July.

Mars Escape and Magnetic Orbiter (cosmic visions candidate) – Andrew Coates is on the steering committee. Contributed to community meeting presentation in July.

Mars Express - instruments currently off late Aug-Nov (eclipses).

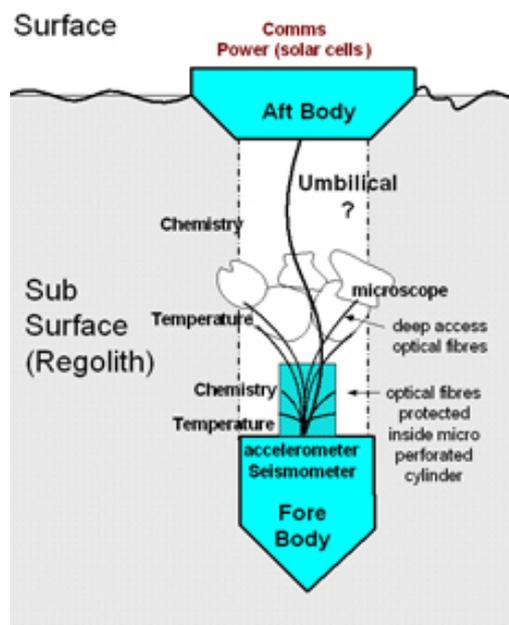
Solar-B EIS - The flight filters were fitted in July and the clamshell pumped down for the final time in late August. The Solar-B spacecraft is now at the launch site undergoing final preparations. Launch is still planned for late evening on Friday 22 September and an event with live TV link will be arranged at MSSL.

Mars Escape and Magnetic Orbiter (cosmic visions candidate) - Andrew Coates is on the steering committee and contributed to the community meeting presentation in July.

News from the Groups

Rob Gowen reports:-

MSSL has developed a UK consortium to develop Planetary Micro-Penetrators which has now gained priority position for funding by PPARC for solar system studies, and recently gained national coverage in the Independent newspaper on 26 July. The development of such devices is a very challenging task, as their purpose is to embed themselves into the surface of planetary bodies by high velocity impact (equivalent to ~mach 2 earth speed) and then collect and transmit scientific information about the planetary body.



Though no such device has yet been successfully deployed on another solar system body, they have great potential for exploration of areas not accessible by very expensive, conventional soft landers. The potential science is also very important, including both exobiological studies via detection of water and organic chemicals and internal structure of planetary bodies via seismic networks. Additionally, because the total mass of such probes is very low, around 2kg-12kg, this necessitates the development and use of micro scientific instruments which are also likely to benefit industry with new potential spin-offs.

The figure shows the “classic” fore-aft body design for kinetic micro-penetrator.

Success at Major British Industry Awards Ceremony

After winning the British Insurance Award for London Market Innovation of the Year in 2004, the team behind the Department’s Tropical Storm Risk (TSR) forecasting venture decided to raise the bar and has now succeeded in scooping the British Insurance Award for Risk Management in 2006.

This prestigious award was presented at the gala British Insurance Awards 2006 ceremony held in front of 1800 dinner guests at the Royal Albert Hall in London on 5th July 2006.



The picture shows Prof Mark Saunders, the Tropical Storm Risk lead scientist, receiving the award from Mark Austin, the ITN 10.30pm news anchorman (right), and Jerry McArthur, Managing Director of CMGL, the award sponsor (left).

The award was won for TSR’s innovations in hurricane modelling and forecasting during 2005/6. These have provided a significant advance in identifying and managing the risk from US hurricanes

for insurers and reinsurers.

The other finalists for the Risk Management Award were Zurich Risk Services, QBE European Operations and RBIG Corporate Risk Services.

TSR's success demonstrates what can be achieved by a small University-led venture without all the resources of large national and multinational companies.

Testimonials on TSR's achievement have been received from influential market figures. Speaking to the Miami Insurance Industry, Lord Levene, chairman of Lloyd's said "One of the main lessons to be learnt from the damaging 2004 and 2005 Atlantic hurricane seasons is the forecasting achievement of Tropical Storm Risk. Although hurricane forecasting first appeared in the 1980s, forecasters have been trying for decades, without success, to deliver accurate predictions on US landfall activity. Scientists at Tropical Storm Risk have made a major step forward in this regard. They are the first to offer a level of precision which is of practical use."

The award success is a testament to the sustained hard and creative work of the whole TSR team (Mark Saunders, Adam Lea, Peter Yuen and Benjamin Lloyd-Hughes).

For further information on TSR please visit www.tropicalstormrisk.com.

Publications - Refereed

S & CP authors are shown in upper case.

A. Published

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B. In Press

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ZANE, S., Neutron star surface emission: beyond the dipole model, in *Isolated Neutron Stars: from the Interior to the Surface*, London, UK, April 2006, ZANE S., Turolla R., Page D. (Eds.), ApSS, Springer, 2006.

Publications - Non-refereed

A. Published

BRANDUARDI-RAYMONT, G., X-ray Aurorae and a Solar Mirror, *Frontiers*, Issue 24, 4-5, 2006. XMM-Newton has solved some of the mysteries of Jupiter's complex X-ray emission, by separating what originates in the aurorae (due to ion charge exchange and electron bremsstrahlung) from that produced at low-latitudes (due to the scattering of solar X-rays).

MCGOWAN, K.E., Charles, P.A., BLUSTIN, A.J., Livio, M., O'Donoghue, D. & Heathcote, B., XMM observations of the supersoft source RX J0513.9-6951, in *Proceedings of "The X-ray Universe 2005"*, San Lorenzo de El Escorial, Spain, 09/2005, 139-144, A. Wilson (Eds.), ESA, 2006.

B. In Press

BRANDUARDI-RAYMONT, G., RAMSAY, G., Wang, C., Bingham, R. & Mendonca, J.T., Multi-band Astronomy with LISA, in *Proc 6th International LISA Symposium*, AIP Conf Series, 2006. We discuss astrophysical scenarios relevant to the generation of gravitational waves (GW) and effects expected to arise from the interaction of GW and electromagnetic (EM) radiation. A strong programme of coordinated GW and EM astrophysical studies must be established in order to ensure the exploitation of the full scientific potential of the LISA mission.

Shaul, D. N. A., Aplin, K., Araujo, H., Bingham, R., Blake, J. B., BRANDUARDI-RAYMONT, G., Buchman, S., FAZAKERLEY, A., Finn, L. S., Fletcher, L., Glover, A., Grimani, C., Hapgood, M., Kellet, B., MATTHEWS, S., Mulligan, T., Ni, W.-T., Nieminen, P., Posner, A., Quenby, J. J., Roming, P., Spence, H., Sumner, T., Vocca, H., Wass, P. & Young, P., Solar, Cosmic Ray and Environmental Physics for, and with LISA, in *6th LISA Symposium*, 2006. This paper describes recent progress in improving estimates of noise and down-time for the LISA mission due to space environment effects. LISA's long-baseline 3-spacecraft configuration in turn will provide a unique opportunity for space environment studies.

Invited Talks and Lectures

Graziella Branduardi-Raymont:

- Annual Specialist Lecture on 'Space Astronomy' at the London International Youth Science Forum - as usual the audience proved to be highly focused on science, inquisitive and enthusiastic. Some of the young students visited MSSL on the following day: they were given presentations on the activities of the Laboratory and a tour of the facilities.

Mark Saunders:

- What does the future hold for Atlantic hurricane activity? Seminar to Lloyd's, London, 26 June 2006.
- Trends in tropical cyclone activity. Actuarial Society Meeting on Catastrophe Modelling, Staple Inn, London, 6 July 2006.
- Storms and climate change, OIL/OCIL Boards of Directors, Lisbon, 20 July 2006.

Conferences and Workshops (National and International)

Astrophysics

The long-established series of annual one-day X-ray astronomy meetings in the UK, usually held at Leicester University, was hosted at MSSL this year on 11 July. The subject was 'New Results in X-Ray Astronomy' and the programme was an exciting combination of talks on the world-class science being undertaken in the UK with the Chandra, XMM-Newton, and especially Swift satellites, not forgetting the RXTE and INTEGRAL observatories. The event even made the UCL News! (see

<http://www.ucl.ac.uk/news/news-articles/0608/06080701> and links from there).

Graziella attended the 6th LISA Symposium at GSFC in June and presented a poster on astrophysical scenarios relevant to the generation of gravitational waves (GW) and on alternative approaches that ought to be considered in making predictions for LISA sources. She also attended a couple of other meetings centred on plans for the analysis of GW data that will be returned by LISA.

The **Planetary Science** group had papers presented at

TITAN ORBITER AEROROVER MISSION (TOAM), presented at Fourth Annual International Planetary Probe Workshop, 27-30 June, 2006, Pasadena, California USA (1).

Asia Oceana Geosciences Society 3rd Annual Meeting, Singapore, 10-15 July 2006 (4).

COSPAR, 16-23 July, China (3).

Plasma interactions with Mars, Venus and Titan and PanCam for ExoMars, presented by Andrew Coates at UCL Cumberland Lodge Meeting 2006 on Astrobiology, 10-12 July 2006.

Plasma Physics Group

COSPAR, 16-23 July, China, Andrew Fazakerley participated, gave 2 talks and one poster.

RAPID-Cluster team meeting, 21-24 August, Los Alamos, Andrew Fazakerley and Andrew Lahiff participated and gave talks.

Europlanet N3 Workshop 'Ionosphere-Magnetosphere Coupling of Fast Flows/Flux Ropes in the Earth's Magnetotail', 31 August-1 September, Graz, Chris Owen participated.

Solar and Stellar Physics Group

Louise Harra hosted a second Sun-Earth connection workshop at MSSL between 19-23 June. It was attended by a number of international visitors including Nancy Crooker, George Siscoe, Cristina Mandrini, Sergio Dasso, Heather Elliott, Jingxiu Wang, Meng Zhao and members of MSSL's solar and space plasma groups.

Presentations were given at the Solar Community meeting in Manchester in July on UK involvement in the EUV Imager for Solar Orbiter, KuaFu (Louise Harra),

Solar Dynamics Observatory (Len Culhane) and the Advanced Technology Solar Telescope (Sarah Matthews). The purpose of the meeting was to help focus the community's priorities for the next 10 years and provide input into PPARC's roadmap.

Sarah Matthews gave a presentation on the Remote and In situ Explorers (RISE) mission at PPARC's Cosmic Visions meeting in July.

Several contributions and invited talks were given at COSPAR in Beijing by Lidia van Driel and Len Culhane and by Lidia van Driel at the IAU in Prague.

Media Broadcasts and Features

Andrew Coates gave interviews on:

- Voyager termination shock structure for Radio Free Europe/Radio Liberty, 2 June 2006.
- Interview on BBC World Service (World Today), BBC News 24 (x2) and BBC World on ExoMars, 12 June.
- Space shuttle and Cassini, GMTV, 30 June; Sky News Radio.
- Space shuttle, BBC World Today (TV), and BBC World Service Newshour, 4 July; Sky News, 6 July.
- Pluto, BBC R5 and News 24, 14 August, BBC news online, C4 news, IRN, 16 August.

Outreach

Graziella Branduardi-Raymont gave a talk about MSSL's research to the Cranleigh 41 Club (Rotary Club members over 40!) at the Punchbowl Inn (a spin off from the MSSL "Key Stakeholders" Open Day on 20 June, which fuelled the interest of a local member in having an after-dinner speaker from MSSL).

Andrew Coates gave talks on Venus Express at Worthing Astronomical Society; Cassini-Huygens to Saturn and Titan, at Vectis Astronomical Society, Isle of Wight.

Lucie Green talked to Croydon Astronomical Society on "Solar physics in the 50 years since the Society was formed". Lucie also organised a morning visit to Cranmore School in West Horsley. The pupils constructed and launched small solid fuel rockets.

Hazel McAndrews visited Collyer's school in Horsham to talk about the broad range of careers possible in the area of space including research, engineering and law.

Alice Breeveld and Tracey Poole spent the day at Ewhurst CE Infant School, where the whole school participated in a host of activities from making and launching Alka-Seltzer rockets, to learning about the solar system, comets and making Mars landers.

Scientific Surrey, a network of science providers within the county, held a meeting at the lab on 24 July. They had a tour around the lab and made contact with various members of our outreach team.

Lucie Green attended a public outreach workshop on 8-9 July run by NESTA.

On the 14-18 August Lucie Green participated in the Children's University Summer School in Bedford. 150 youngsters aged between 8 and 12 attended the school, and Lucie provided talks and workshops on impact craters and the death of the dinosaurs.

Lucie also attended a Summer School run by the National Academy for Gifted and Talented Youth at Imperial College, 21-25 August. This was a general Astrophysics Summer School which catered for talented youth between the ages of 12 to 16.

Other News

In June the Space Plasma Physics Group started a new series of Group Seminars given by visitors. The seminar page, http://www.mssl.ucl.ac.uk/www_plasma/exec/discussion_group.php, gives information about past and future speakers.

Mark Saunders met the Prince of Wales and Duchess of Cornwall at Lloyd's in London on 27 June as part of a group of five experts to discuss Climate Change.

Adam Lea and Mark Saunders completed consultancies for Sutton and East Surrey Water and for Catlin Insurance Company Ltd.

Next Issue

The next issue of the Department of Space and Climate Physics Newsletter (Volume 4, Issue 3) will be published in December 2006. This will cover activities from 1 September 2006 to 30 November 2006.