



**The Newsletter - Volume 8, Issue 2**  
**6<sup>th</sup> October 2010**

**Covers events between 1<sup>st</sup> June 2010 and 31<sup>st</sup> August 2010**

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**General**

We are pleased to welcome nine new PhD research students to MSSL. They are David Barnes, Rob Grand, Susan Hutton, and Idunn Jacobsen (Astrophysics), Arrow Lee, Wil Poole and Daoxi Zhang (Imaging). Tom Nordheim (Planetary) and David Shelton, (Solar).

**New Staff Members**

Dr Steve Bouderault has joined the Astrophysics group to work with Mark Cropper and Steve Baker.

**Visitors**

A visit to UCL by Russian space scientists took place between 30 June and 2 July. Organized by UCL and the International Science and Technology Centre (ISTC) and hosted by MSSL, the visit included presentations and discussions with UCL staff, a visit to MSSL and an open meeting at UCL attended in part by David Willetts MP, Minister of State for Universities and Science and Victor Spasskiy, Trade Representative, Trade Delegation of the Russian Federation in the UK.

The visit proved a great success. Many areas of common interest were identified and we have discovered a treasure trove of ideas and opportunities. We established excellent working relations and look forward to building a cooperative programme in the future.



**The picture shows Alan Smith receiving a present from Steve Bourne of ISTC**

Izabela Spaleniak from the University of Jena visited MSSL for three weeks to work with Rob Bedington on a course project, for the International School of Advanced Instrumentation, to develop a concept for a two-arm spectrograph for the William Herschel Telescope.

Drs Jonathan Rae and Clare Watt from the University of Alberta visited the Space Plasma Group to work with Andrew Walsh and Colin Forsyth. Jonathan gave a talk entitled "Ground-based constraints for determining the initiation mechanism for substorm onset". Clare talked about "Field-aligned Electron Acceleration Due to Alfvén Waves in Auroral Plasma".

Chris Arridge supervised a number of summer students. Jiameng Gao (BHASVIC School, Brighton) studied applications of artificial neural networks to Cassini electron data and built networks that could recognise bimodal electron distributions and that could estimate the spacecraft potential from measured electron spectra. Ashwin Braude (University College School, London) worked on modelling charged dust grain motion in the plumes of Enceladus and improved our existing numerical model by including a more accurate description of the Alfvén wings at Enceladus. Chris also helped to supervise Brandon Robson-Clarke (with Dhiren Kataria) and he worked on concepts for a cubesat mission to the moon. All three

students were at MSSL on Nuffield Schools and Colleges Bursaries.

### **Prizes and Awards**

Professor Saku Tsuneta, Director of the Hinode Science Center, National Astronomical Observatory of Japan was awarded a UCL Honorary Fellowship.

### **Promotions**

Congratulations go to Andrew Fazakerley on his promotion to Professor and to Silvia Zane who has been promoted to Reader.

### **Grants Awarded**

ExoMars PanCam, £2.7 million, UK Space Agency, June 2010. Grant to cover next 3 years of PanCam development.

### **Proposals Submitted**

JuMMP report to ESA, Aug 2010.

### **Telescope/Satellite Time Awards/Proposals**

Roberto Soria carried out radio observations of NGC 7793 from the ATCA radio telescope in Australia. He is also involved in several successful observing proposals:

- HST proposal, awarded 5 HST orbits to observe a microquasar jet in NGC 7793. Observations scheduled for July 2011. (PI)
- VLT proposal, to image the candidate intermediate-mass black hole in the galaxy ESO243-49 in several bands. (PI)
- Chandra Large Project proposal, awarded 700 ks to observe the spiral galaxy M83 (a follow-up work of Soria & Wu 2002, 2003). PI: Knox Long (Johns Hopkins). Observations to start in 2011. (CO-I)
- VLT proposal to take optical spectra of the ultraluminous X-ray source P13. PI: Christian Motch (Strasbourg). Observations scheduled for Oct/Nov 2010. (Co-I)
- Swift proposal to monitor P13 over a few weeks, in an attempt to find its orbital period. PI: Christian Motch (Strasbourg). Observations underway. (Co-I)

### **Mission Status and Developments**

**Cassini** - ELS working well. Many talks and presentations given including WPGM, AOGS, PRL workshop and COSPAR.

**Cluster** - 16 July and 9 August were the 10th anniversaries of the launch of the Cluster spacecraft. Ten years on, the PEACE instruments remain in good health and are still returning data.

**EJSM** - Andrew Coates attended a surface element and JSDT meeting in ESTEC, 23-25 June. Rob Gowen attended an instrument workshop in Pasadena, 27-29 July. JuMMP meeting via WebEx, 18-20 Aug.

**ExoMars** - Development continuing. Astrium-MSSL meeting, 8 July. PanCam 3d vision workshop in Aberystwyth, 12-14 July. Meeting at TAS-I on on-board software, 20-21 July. Claire Cousins (UCL), N. Schmitz (DLR) and A. Bauer (Joanneum research) attended AMASE campaign in Svalbard, August.

**Solar Orbiter** - The Space Plasma Group will share in the Cosmic Visions award from the UKSA through leading the development of the Solar Wind Analyser (SWA) instrument for Solar Orbiter. As Principal Investigator of the Solar Wind Analyser Consortium, Professor Chris Owen attended the 4th Solar Orbiter SWT and the Solar Orbiter Programme Readiness Review at ESA HQ in Paris in early June. A team meeting for the SWA consortium was held at ISSI, Bern, 26-29 July.

**Venus Express and Mars Express** - Instruments working well. Andrew Coates attended the ASPERA team meeting in Kiruna, 8-11 June.

## Publications – Refereed

### Published

- Attrill, G. D. R., Harra, L. K., van Driel-Gesztelyi, L., & Wills-Davey, M. J. Revealing the fine structure of coronal dimmings and associated flows with Hinode/EIS. 2010, *Solar Physics*, 264, 119.  
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- Li, C., Owen, C. J., Matthews, S. A., Dai, Y., & Tang, Y. H. Major electron events and coronal magnetic configurations of the related solar active regions, *ApJL*.
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## Publications - Non-refereed

### Published

Soria, Roberto; Pakull, Manfred; Broderick, Jess; Corbel, Stephane; Motch, Christian, Radio lobes and X-ray hot spots of the extraordinary microquasar in NGC 7793, 2010, AIPC, 1248, 127, 2010.

### Invited Talks and Conferences

Adam Masters gave an invited talk at the Western Pacific Geophysics Meeting 2010 Taipei, Taiwan, 21-25 June.

- Cassini Observations of Saturn's Bow Shock and Magnetopause, A. Masters, the Cassini Plasma Spectrometer Team, the Cassini Magnetometer Team, the Cassini Radio and Plasma Wave System Team, the Cassini Magnetospheric Imaging Instrument Team, and the Plasma Environment in Saturn's magnetosphere Interdisciplinary Investigation Team.

RSC Faraday Discussion meeting (147) on Chemistry of the Planets, St Jacut de la Mer, 15-16 June 2010. Andrew Coates (invited talk) and Anne Wellbrock attended:

- Coates, A.J., A. Wellbrock, G.R Lewis, G.H Jones, D.T Young, F.J Crary, J.H. Waite Jr, R.E. Johnson, T.W Hill and E.C Sittler, Negative ions at Titan and Enceladus: recent results.

AOGS, Hyderabad, 5-9 July 2010. Andrew Coates gave two invited talks:

- Pickup Ion Observations at Solar System Bodies.
- Electrons at Venus, Mars and Titan.

Advances in Planetary Atmospheres and Exploration, Ahmedabad, India, 12-13 July. Andrew Coates gave two invited talks:

- Electrons at Venus, Mars and Titan.
- Plasma observations at Saturn (with Young, D.T.).

COSPAR, Bremen, 18-25 July. Members of the Solar and Stellar Physics Group and the Planetary Science Group attended:

Several Sessions were organized by members of the Solar Group:

- Len Culhane and Louise Harra: Flows in Solar magnetic Structures STEREO and HINODE.
- Lidia van Driel-Gesztelyi: Multi-spacecraft observations and modeling of CMEs and

stream interaction regions.

Oral Contributions were given by:

- Coates, A.J., A. Wellbrock, S. Tsang, R. Frahm, D. Winningham, S. Barabash, R. Lundin, D. Young, F. Crary, Ionospheric photoelectrons: comparing Earth, Venus, Mars and Titan (invited).
- Cecconi, B, L. Lamy, P. Schippers, P. Zarka, C.S. Arridge, M. Dougherty, P. Louarn, N. Andre, W. Kurth, A. Coates, SKR properties measured within its source region: local conditions, radio source location.
- Edberg, N.J.T. K. Ågren, J.-E. Wahlund, M. Morooka, S.W.H. Cowley, R. Modolo, Ronan; C. Bertucci, M.K. Dougherty, Structure of the Titan plasma environment during 5 consecutive and similar flybys.
- Ågren, K., D.J. Andrews, A. Coates, S.W.H. Cowley, N.J.T. Edberg, R. Modolo, G. Provan, L. Rosenqvist, J.-E. Wahlund, A. Wellbrock, Cassini observations of ionospheric currents at Titan.
- Cravens, T., A. Coates, J.H. Waite, R. Tokar, M. Perry, N. Ozak, I. Robertson, S. Ledvina, A. Wellbrock, Water group ions in the plume of Enceladus.
- Deborah Baker and Lidia van Driel-Gesztelyi: Magnetic reconnection along QSLs - a major driver of active region outflows.
- Louise Harra: An overview of the solar corona during the recent solar minimum and prospective for the new solar cycle.
- Louise Harra: What coronal dimming regions can tell us about CMEs ? New results from HINODE.
- Chuan Li, Sarah Matthews and Lidia van Driel-Gesztelyi: Coronal magnetic topology and the solar source of beam-like electron events".
- Lidia van Driel-Gesztelyi: EIT/Coronal waves and coronal dimming: a holistic approach. (Review Talk)
- Lidia van Driel-Gesztelyi, Len Culhane and Deborah Baker: Interacting active regions and coronal holes: implications for coronal outflows and solar wind structure.
- Chuan Li: Coronal magnetic topology and the solar source of beam-like electron events.

Sheila Kanani presented at the second "Active Enceladus" ISSI meeting.

Roberto Soria gave a seminar at Tsinghua University (Beijing) and talked at the X-ray astronomy workshop in Durham.

Lucie Green, Dave Williams and Colin Forsyth, along with Jim Wild of Lancaster University, organized an RAS Meeting entitled "A New Generation of UK Space Exploration". This was a follow-up to the UKSP/MIST Missions Forum held at NAM and was held to discuss potential new missions in heliophysics, in the light of the recent call from ESA for new proposals. Talks from MSSL were given by Geraint Jones, Andrew Coates, Dave Williams, Graziella Branduardi-Raymont, Andrew Fazakerley, Sarah Matthews, Chris Owen and Dhiren Kataria. Details can be found at [www.mssl.ucl.ac.uk/www\\_plasma/mist\\_uksp\\_missions](http://www.mssl.ucl.ac.uk/www_plasma/mist_uksp_missions). A number of these talks were also given to the UKSA meeting on the previous day.

Rob Bedington attended the ESA/CNES 4S (Small Satellites Systems and Services) Symposium on Madiera where he gave a talk on MSSL's plasma analyser miniaturisation programme.

Ken Phillips attended and gave an invited review at the 6th Patras Workshop on Axions/WIMPs/WISPs (dark matter candidates), University of Zurich, July 4-9, and then visited the CAST axion telescope at CERN.

David Williams gave a seminar at the Centre for Plasma Astrophysics (Katholieke Universiteit Leuven) entitled "Non-thermal motions: how the Sun's atmosphere responds to coronal restructuring before it happens".

Louise Harra gave a lecture entitled, "Introduction to the Solar System" at Leeds University for the STFC Introductory Summer school for PhD students.

### Media Broadcasts and Features

Andrew Coates:

- Information on ExoMars for Professional Engineering magazine, 7 July.
- Provided information on the FAME-P proposal for BBC News online  
<http://www.bbc.co.uk/news/science-environment-10708536>

Len Culhane, Lucie Green and Santiago Vargas Dominguez:

- Reported in the media on the eruption of the Sun on 1 August which sent a charged cloud into space, reaching our planet within approximately 2 days.

Colin Forsyth:

- Interviewed for July's Sky At Night Magazine on the auroral processes being studied by Cluster.
- Interviewed by the BBC for an article on their website on the possibility of seeing aurora in the north of England and Scotland (<http://www.bbc.co.uk/news/science-environment-10880852>).

Lucie Green:

- Interviewed on BBC Sussex and Surrey about the discovery of the most massive star so far.
- Interviewed on BBC Surrey and Sussex about Stephen Hawking's comment that man will need to leave the Earth in the future.
- 15 interviews on local BBC radio stations about the Perseid meteor shower.

Louise Harra:

- Was at the Science Museum with an MP delegation to the Fast Forward exhibition which features Hinode.  
[http://www.sciencemuseum.org.uk/visitmuseum/galleries/fast\\_forward.aspx](http://www.sciencemuseum.org.uk/visitmuseum/galleries/fast_forward.aspx)

Chris Owen:

- Interviewed by 'The Engineer' magazine who were interested in MSSL's involvement in the Solar Orbiter SWA consortium.  
<http://www.theengineer.co.uk/video/ucl-technology-analyses-suns-effect-on-earth/1003801.article>
- An article on the UK involvement in the candidate Cosmic Vision missions (Solar Orbiter, Euclid, Plato) appeared in the 'Metro' on 16 July. (<http://e-edition.metro.co.uk/2010/07/16/22.html>)

### Press Releases

UK Space Agency funds international Mars Rover, UK Space Agency, 11 June.

MSSL designs 'eyes' of robot scientist bound for Mars, UCL press release, 15 June.

ESO press release (with M Pakull and C Motch), on our optical study of microquasar jet bubble in NGC 7793.

<http://www.eso.org/public/news/eso1028/>

Chandra press release (with M Pakull and C Motch) on our multiband study of that same black hole.

[http://chandra.harvard.edu/press/10\\_releases/press\\_070710.html](http://chandra.harvard.edu/press/10_releases/press_070710.html)

Roberto Soria:

- The discovery of a jet-dominated black hole in NGC 7793, with my MSSL contribution, appeared on the BBC News front page <http://www.bbc.co.uk/news/10555633> and on many other mainstream media, for example MSNBC <http://www.msnbc.msn.com/id/38134515/>
- and even on David Icke's blog <http://www.davidicke.com/forum/showthread.php?t=124270>

### PhDs awarded

Jennifer Rourke (nee Barnes) has passed her PhD viva. The title of her thesis is "Seasonal Prediction of African Rainfall with a Focus on Kenya".

### Outreach

Andrew Coates:

- Recent results from Cassini, presented at Bristol Astronomical Society, 4 June.
- Venus Express, Cassini and ExoMars, presented at Loughton Astronomical Society, 1 July.

Roger Duthie:

- Organized volunteers for the UKSA "Future's Day" at the Farnborough Air show. Volunteers included Jason Rawlings and Dale Potts from MSSL.

Colin Forsyth:

- Took part in the Space Academy Careers Event at the National Space Centre in Leicester on 28 June. The event was designed to show sixth form students the possibilities of a career in science.

Lucie Green:

- Cheltenham Science Festival:
  - Talk to general public and school students about the Sun, its recent low activity levels and the future with Solar Orbiter.
  - Panel discussion about topical science with David Willetts, Mark Henderson and Andrew McMichael.
- Ewhurst History Society - talk about solar physics at MSSL.
- Cafe Scientifique - charring the event with Jocelyn Bell Burnell and the poet Jamie

McKendrick as part of the Royal Society's 350th anniversary celebrations.

- Seeing Further Festival - a weekend course for teachers looking at the Science behind the new book and classical music for children, "Icarus at the Edge of Time".
- Holmbury St. Mary Flower Show - judging and awarding prizes for the space art and rocket building.
- Norman Lockyer Observatory Astronomy Fair - a talk about the Sun, solar research at MSSL and the future with Solar Orbiter.
- Ockley, Okewood and Forest Green Flower and Summer show - with Alison Wallace and Craig Theobald discussing the work at MSSL.
- In the Shadow of the Sun - event at the British Film Institute with Danny Boyle, Brian Cox and Honor Harger discussing the solar research at MSSL and the Solar Orbiter mission.

Ian Hepburn:

- Two days of science activities for year 5 students at Seymour primary school, Crawley, on 15/17 June.
- Two rocket activity evenings for 5th/10th Horsham Beaver scout group, 16/25 June.
- Three days of science activities to the whole of Greenfield School, Woking, 21-23 June.
- Lead a rocket workshop at Tanbridge House school science club, 24/29 June and 6 July.
- Ran a year 6 primary to secondary transition science workshop at Tanbridge House school on the 21 July with Alison Wallace. This was attended by 243 children.

Sheila Kanani:

- Corporate evening for local businesses and the local community at MSSL.
- Lovebox festival as the "official" space scientist on site.
- Newspaper article about the open day in the Dorking Advertiser.
- Senior Space School UK - teaching and mentoring 15-18 year olds at a residential summer camp.

Adam Masters:

- Organised a visit to the lab by 15 students and their teacher from Sutton Grammar School for Boys. The students toured of the lab, listened to

a number of talks, and discussed the work they had been doing with Cassini data.

Chris Owen, Lucie Green and Dave Walton:

- Gave talks as parts of a visit of the local U3A group to MSSL on 28 June.

Roberto Soria:

- Talk to the International Youth Science Forum students during their visit to MSSL.

Alison Wallace:

- Talk on the many solar cycles for the Southern Area Group of Astronomical Societies (SAGAS) annual summer meeting.
- Assisted Ian Hepburn with the Mars Lander Experiment at Tanbridge House school in Horsham. The event involved 240 children from local primary schools.
- Gave an introduction to the Sun and solar missions at MSSL during the visit by the Collyer School students.
- Took part in the debating summer school run by Widening Participation at UCL. She gave a talk to inform a group of 90 15-16 year olds about the arguments surrounding the issue of space commercialisation. The teenagers then went on to have a lively debate on the subject.

David Williams:

- Lecture entitled "The Power of the Sun" for the SolarFest 2010 in Dublin, organized by the Irish Federation of Astronomical Societies.

### **Social Club**

The 4th Annual MSSL Croquet Tournament took place over the summer with 10 teams competing for the prestigious MSSL Mallett Trophies. There was a good mixture of seasoned regulars, improving teams and complete novices. The format was two groups of 5, with the top two graduating to the semi-finals. Climate Extremes (Mark, Adam and Alan) defeated Aztecs (Awat and Katherine) to set up a final with Probes 'n' Globes (Annie, Geraint and Andrew), who knocked out The Legendary Planetary A-Team (Gethyn, Yudish and Neville). Congratulations to Climate Extremes, who won the final, 2-0, to become the first team in MSSL Croquet history to retain the trophies.

### **Next Issue**

The next issue of The Newsletter (Volume 8, Issue 3) will be published in December 2010. This will cover activities from 1 September to 30 November 2010.