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Lasers for Science Facility operational statistics 08/09

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RAL-based experiments

Within the reporting period the LSF welcomed the arrival of the Advanced Single Molecule Imaging and Dynamics (ASMID) group from Daresbury adding new capability to LSF's biological science programmes. The year also saw the LSF beginning to restructure itself in readiness to moving into the new Reseaerch Complex at Harwell presently under construction as well as adapting its structure following the previous year's reviews. In the reporting period (April 2008 to March 2009), 29 different User groups performed a total of 35 experiments in the LSF laboratories at RAL. A total of 2785 hours laser time was delivered to the User community and European Users throughout the year, with only 89 hours downtime. The majority subject group scheduled was biological related science, see figure 1. A full breakdown by subject number of weeks applications verses weeks scheduled is shown in figure 2 showing between a 2-3 times oversubscription. The RAL-Based schedule is shown in table 1. The average User satisfaction marks obtained from the scheduled users are shown in figure 3. There were a total of 51 formal reviewed publications produced from the years efforts, with the LSF programme supporting 11 students working towards a PhD in the reporting year.

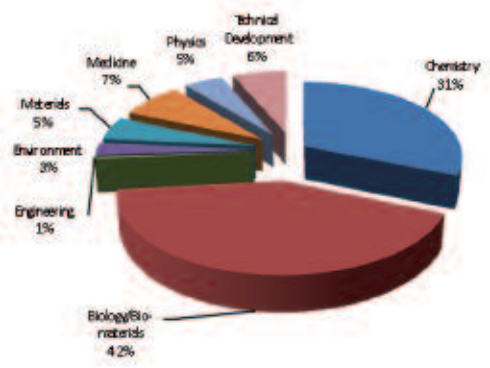

Figure 1. RAL-based bids by subject group.

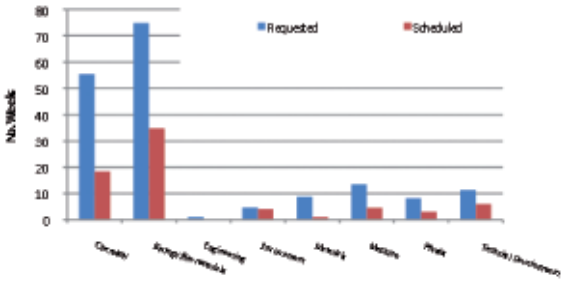

Figure 2. RAL-based experiments by subject.

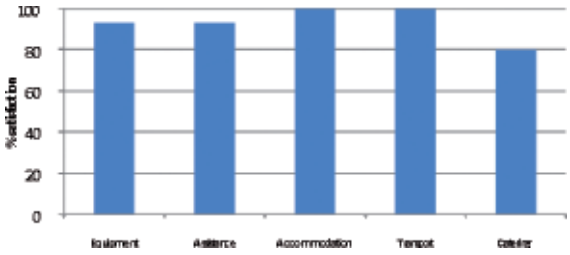

Figure 3. RAL-based average user satisfaction scores.

Loan Pool

During this reporting period the LSF was successful in obtaining a new 5 year grant worth £2.6M from EPSRC (EP/G03088X/1) to continue operation of the Loan Pool, which had for some time been operating on the remaining funds from the previous grant. These funds will see 6 of the pool's 8 lasers replaced with the old systems retired to the user community. The LSF is at present in the process of establishing a steering committee for the Loan Pool to advise on development strategies for the Laser Loan Pool facility, helping to assess potential purchases to ensure continued popularity amongst the UK research community by operating lasers suited to its requirements and thus maintaining the standard of the facilities internationally leading research.

The Loan Pool delivered 484 weeks of laser time in the reporting period with a ratio of weeks applied versus scheduled of 1.59:1. Downtime was only 9 weeks and was due to minor breakdowns throughout the year. The years activity saw 8 new research groups use the Loan Pool. The chemistry community was once again the biggest user with 50% of allocated time, however there has been an increase in applications and usage of the pool for bioscience. The breakdown is shown in figure 4. The Loan Pool schedule is shown in table 2. There were a total of 10 publications, 3 conference presentations including posters and 4 PhD thesis published during the reporting year.

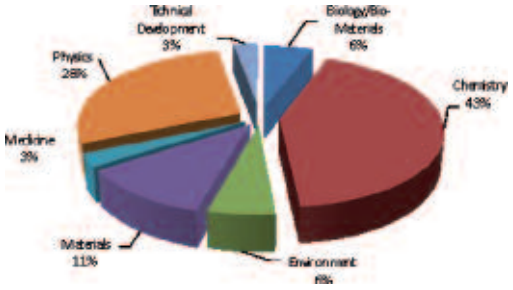

Figure 4. Loan Pool bids by subject group.

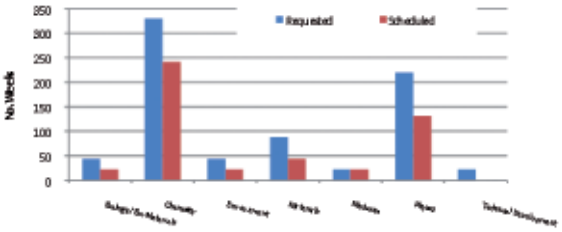

Figure 5. Loan Pool experiments by subject.

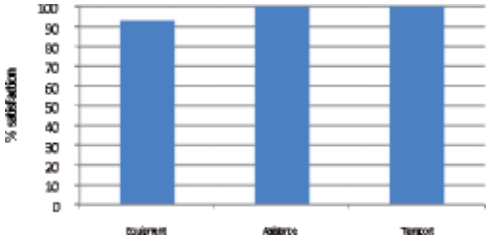

Figure 6. Loan Pool average user satisfaction scores.

Date	Confocal Microscopy Laboratory	Raman Tweezers Laboratory	ASMID	Ultrafast Spectroscopy Laboratory
Mar 31		MAINTENANCE		**A. VLCEK** 81,005 (QMUL)
April 07	**P. O'NEILL** 81,048 (MRC)	**A. WAGNER** 81,057 (Diamond)		MAINTENANCE/ TOPAS INSTALLATION
April 14		**P. GARDNER** 81,035 (MIB) *Optical tweezers Raman spectroscopy of cell lines*		
April 21	**C. STUBBS** 81,033 (Brookes)			LABORATORY SETUP AND TRAINING
April 28	**A. JESHTADI** 81,007 (Brookes) *Fowlpox virus putative structural protein interactions*			**A. WARD** 81,064 (CLF) *White-light whispering gallery modes*
May 05				
May 12			**C. BALLESTREM** 81,051 (Manchester)	
May 19	MAINTENANCE			**T. WELLER** 81,065 (ISIS) *Graphitisation of diamond using ultrafast lasers*
May 26	**P. O'NEILL** 81,048 (MRC)			
June 02				
June 09				TRIR TESTS
June 16				ULTRA IMPLEMENTATION
June 23			**J. SANDERSON** 81,052 (Durham)	**S. MEECH** 72,022 (UEA)
June 30	**C. BALLESTREM** 81,051 (Manchester)			ULTRA IMPLEMENTATION
July 07		**P. O'NEILL** 81,048 (MRC)	**A. WARD** (STFC/MSF) *Cloud chamber*	
July 14			TWEEZERS NANOPROBE DEVELOPMENT	**P. PORTIUS** 81,066 (Sheffield) *TRIR study of the photochemistry of energetic compounds*
July 21		**R. BISBY** 81,037 (Salford)		
July 28				
Aug 04	MAINTENANCE			
Aug 11			**A. WARD** (STFC/MSF) *Cloud chamber*	**S. QUINN** 81,030 (Trinity College Dublin) *Unravelling the photodynamics of nucleic acid base systems*
Aug 18			**M. KING** 81,069 (Royal Holloway)	
Aug 25	**T. NG** 81,009 (King's College London) *Unravelling supra-molecular rules in signal receptor networks*		**A. WARD** (STFC/MSF) *Cloud chamber*	2D-IR PREPARATION
Sept 01	**K. SADER** 81,018 (SuperSTEM)		**M. KING** 81,069 (Royal Holloway)	**S. QUINN** 81,030 (Trinity College Dublin)
Sept 08	**A. JACKSON** 81,026 (Cambridge)			2D-IR PREPARATION
Sept 15				**N. HUNT** 81,020 (Strathclyde) *Transient 2D-IR spectroscopy – real time absorption of chemical reactions*
Sept 22	**A. SHRIVE** 81,039 (Keele)			

Table 1. Lasers for Science Facility RAL-based schedule period 1 and 2 (2008/09).

Date	Confocal Microscopy Laboratory	Raman Tweezers Laboratory	ASMID	Ultrafast Spectroscopy Laboratory
Sept 29		**R. BISBY** 81,037 (Salford)		**N. HUNT** 81,020 (Strathclyde)
Oct 06	**A. SHRIVE** 81,039 (Keele)			
Oct 13	**T. NG** 81,039 (King's College London)	**I. MUELLER-HARVEY** 81,072 (Reading)		
Oct 20	**K. SADER** 81,018 (SuperSTEM)			ULTRA DEVELOPMENT
Oct 27	**C. BALLESTREM** 81,051 (Manchester)			
Nov 03	**K. SADER** 81,018 (SuperSTEM)		**J. SANDERSON** 81,052 (Durham)	**A. PARKER** 81,043 (CLF) *Characterisation of intermediates in serotonin and 5-hydroxytryptophan*
Nov 10	**A. SHRIVE** 81,039 (Keele) *Structural studies of human CRP interaction with C-polysaccharide*	**A. JESHTADI** 81,007 (Brookes)		
Nov 17		**C. STUBBS** 81,033 (Brookes)	**C. NEYLON** 81,070 (ISIS) *Single molecule studies of the Tus-Ter protein DNA interaction*	**A. VLCEK** 81,005 (QMUL) *Electron hopping in proteins*
Nov 24		TRAINING		
Dec 01	**K. SADER** 81,018 (SuperSTEM)			**I. CLARK** 81,061 (STFC) *Temperature and time resolved spectroscopy on the ultrafast timescale*
Dec 08	**A. SHRIVE** 81,039 (Keele)		**A. WAGNER** 81,057 (Diamond)	
Dec 15				
Dec 22	CHRISTMAS AND NEW YEAR			
Dec 29				
Jan 05	RELOCATION OF ASMID		BT-LIBRA DEVELOPMENT	**I. CLARK** 81,061 (STFC) / **M. KUIMOVA** 81,071 (Imperial) *Electron and energy transfer from 2-aminopurine to guanine*
Jan 12				ULTRA DEV.
Jan 19				
Jan 26		**C. STUBBS** 81,033 (Brookes)		ULTRA DEVELOPMENT
Feb 02		**A. JESHTADI** 81,007 (Brookes)		
Feb 09			**C. PFRANG** 81,025 (Reading) *Exploring NO_x chemistry in levitated aqueous aerosol droplets*	
Feb 16		**C. STUBBS** 81,033 (Brookes) *Protein signalling pathways involving P13K, mTOR and MEK*		**J. KELLY** 81,028 (TCD) *TR^3 spectroscopy of quantum dots*
Feb 23			CALL FOR ACCESS AUTUMN 2008	ULTRA DEV. / **S. ELLIOTT** 81,015 (Cambridge)
Mar 02				ULTRA DEVELOPMENT
Mar 09				
Mar 16				ULTRA DEV. / **P. MATOUSEK** 81,063 (STFC) *NIR Kerr Gate*
Mar 23				
Mar 30				

Table 1. Lasers for Science Facility RAL-based schedule period 1 and 2 (2008/09) ***(continued)***

Date	NSL1 YAG/Dye Powerlite + Sirah + SHG + DFG	NSL2 YAG/Dye Powerlite + Sirah + SHG + MAD	NSL3 YAG/ Mid-band OPO + SHG	NSL4 YAG/Dye Powerlite + Sirah + SHG	NSL5 YAG/Dye Spectra Pro + Sirah + SHG	UFL1 Coherent Verdi/Mira + SHG + THG	UFL2 Coherent Libra OPerA Ultrafast Amp + OPA	CWL1 Frequency Doubled Argon Ion
Feb 25			S. Elliott (Cambridge) 72,006	S. Hochgreb				J. Weinstein
Mar 03	I. Walmsley	L. Snoek		(Cambridge)		J. Wu	A. Hodgson	(Sheffield)
Mar 10	(Oxford)	(Oxford)		*CO/NO laser*		(York)	(Liverpool)	*Resonance Raman insight*
Mar 17	72,024	72,003		*induced*		*Ultrafast spin*	*Surface*	*into electronic*
Mar 24				*fluorescence*		*dynamics in*	*dynamics*	*structure of*
Mar 31				72,005		*heat-assisted*	*initiated by*	*photo-, solvato- and*
April 07						*magnetic*	*hot electrons*	*electrochromic*
April 14						*recording*	72,012	*metal-based*
April 21						72,043		*molecular*
April 28								*systems*
May 05								72,045
May 12								
May 19								
May 26								
June 02								
June 09								
June 16								
June 23								
June 30	I. Walmsley							
July 07	(Oxford)	Simons		L. Snoek				
July 14	*Attosecond*	(Oxford)		(Oxford)				
July 21	*pulse*	*Hydrophilic and*	S. Elliott	*IR-MPD of*	G. Hancock		J. Wu	M. Brust
July 28	*generation*	*hydrophobic*	(Cambridge)	*small histidine-*	(Oxford)		(York)	(Liverpool)
Aug 04	*by molecular*	*carbo-hydrate*	*Stimulated*	*containing*	*Vibrational*		*Ultrafast*	*Laser photo-*
Aug 11	*modulation in*	*interactions*	*Raman and*	*antioxidant*	*emission from*		*angular*	*thermal*
Aug 18	*hollow-core*	80,001	*rare-earth-ion*	*peptides in a*	*electronic*		*momentum –*	*cancer*
Aug 25	*photonic*		*mid-IR*	*quadrupole*	*quenching*		*energy transfer*	*therapy*
Sep 01	*crystal fibres*		*emission*	81,049	81,049		*between*	*using metal*
Sep 08	81,062		*spectroscopies*				*photons and*	*nanoparticles*
Sep 15			81,024				*spins in CoPt*	81,004
Sep 22							*TbFe*	
Sep 28							81,053	
Oct 06								
Oct 12								
Oct 20						A. Jones		
Oct 27						(Edinburgh)		
Nov 03						*2-photon*		
Nov 10						*excitation*		
Nov 17						*microscopy*		
Nov 24						*and confocal*		
Dec 01						*FLIM*		
Dec 08						81,011		
Dec 15								
Dec 22								
Dec 29								
Jan 05								
Jan 12				L. Snoek				
Jan 19	Hippler			(Oxford)				Dutton
Jan 26	(Sheffield)	Simons		*Studying the*				(STFC)
Feb 02	*High-*	(Oxford)		*influence of*			Bennington	*Surface*
Feb 09	*resolution*	*Carbo-hydrate*		*metal carbon*	Carty		(STFC)	*Raman*
Feb 16	*stimulated*	*molecular*		*binding on*	(Durham)		*Using tip*	*spectroscopy*
Feb 23	*Raman*	*recognition:*	Ruddock	*zinc finger*	*A radical*		*enhanced*	*of photo-*
Mar 02	*spectroscopy*	*probing CH-pi*	(Strathclyde)	*moldel*	*beam source*		*femtosecond*	*catalytic*
Mar 09	*with photo-*	*interactions*	*Nonlinear*	*peptide*	*for an*		*lasers to*	*hydrogen*
Mar 16	*acoustic*	82,007	*spectroscopy*	*folding*	*experiment to*		*create graphite*	*production*
Mar 23	*detection*		*of doped glass*	82,004	*magnetically*		*nanostructures*	*processes*
Mar 30	*(PARS)*		*and crystal for*		*trap cold*		*on diamond*	82,001
Apr 06	82,008		*applications in*		*(NH(X) at high*		82,010	
Apr 13			*distributed*		*densities*			
Apr 20			*fibre sensing*		82,004			
Apr 27			82,005					
May 04								
May 18								

Table 2. Lasers for Science Facility Loan Pool schedule period 1 and 2 (2008/09).