Guidelines for UKSP/MIST Introductory and Advanced Summer Schools Organisers

Typically, a summer school will start Monday morning and end Friday lunchtime with an afternoon off during the week. This gives 16 slots of 1.5 hours each. We propose that, in each school, 12 of these are filled with a 'core' curriculum, which should include a "careers" element in the Advanced School. This will leave some flexibility for course organisers to present topical lectures perhaps reflecting their own group's activities, have hands-on activities and schedule student talks.

STFC's own guidance reads: *"Courses or schools must be held in a core research activity supported by the STFC studentships programme (astronomy, solar system science, particle astrophysics, particle physics, nuclear physics) and must be aimed primarily at STFC-funded PhD students. Courses of a specialist technical nature will not be supported."* Our schools therefore fall within this remit.

The organisers of each school need to put in an application to STFC about a year before the summer school. We strongly recommend contacting the previous organizers for information and advice. Please note that funding is increasingly competitive and is not guaranteed.

All bids must be contained within three pages and provide the following information:

- the dates and venue of the proposed course or school;
- justification for the course or school, in terms of its relevance to the STFC studentships programme;
- the number of STFC PhD students who would benefit from the course or school;
- a detailed breakdown of the budget requested;-details of the proposed lectures and courses.

Bids are normally to be submitted as an e-mail attachment to studentships@stfc.ac.uk, by 1 October.

The key STFC contact is:

Ms Clare Heseltine,
Studentships Manager,
Science and Technology Facilities Council,
studentships@stfc.ac.uk
Tel: 01793 442118
http://www.stfc.ac.uk/2799.aspx

Below are the suggested core lectures for each of the schools. Each lecture represents 1.5 hours with a small break in the middle.

Introductory Solar System Plasmas School (about 16 lectures in total)
Core content:
1) Introduction to Plasma Physics: gyration, drifts, plasma oscillations, EM waves in magnetised plasmas, elements of plasma kinetics.
2) Introduction to MHD: MHD equations: applicability conditions, MHD equilibria, basic timescales and dimensionless parameters.
3) Solar interior and helioseismology: Dynamo theory, differential rotation, global and local helio-seismology and its results.
4) MHD Waves and Instabilities: Waves in uniform media, modes of a magnetic flux tube, basic macroscopic and microscopic instabilities.
5) Magnetic reconnection: 2D reconnection (Petschek + Sweet-Parker), basic concepts of topology, diffusion regions and observational investigation.
6) Introduction to the Solar Atmosphere: photosphere, chromosphere, TR, corona, heating, flares.
7) CMEs, the Solar Wind and the Heliosphere: Basic solar wind models, basic structures, phenomenology of CMEs, MHD turbulence, heliopause.
8) The Magnetosphere: basic topology, bow shock and magnetopause, magnetotail, plasmasphere, radiation belts, ring current, current systems, substorms and geomagnetic activity.
9) The Ionosphere: formation and structure, ion-neutral coupling, vertical coupling, dynamics, energy dissipation, chemistry, auroral acceleration, conductivities and currents
10) The Mesosphere and Thermosphere
11) Planetary plasma environments: giant planet magnetospheres, rapid rotation and M-I coupling, plasma transport, Dungey and Vasyliunas cycles, miniature and induced magnetospheres, comets.
12) Solar variability and climate: solar irradiance effects, UV variability, stratospheric chemistry and dynamics, coupling to troposphere, effects of SEP and radiation belt particles, cosmic rays.
13) Career planning

Advanced Solar-System Plasmas School (about 16 lectures in total)
Core content:
1) Overview of the Sun-Earth System and state-of-the-art observations: including quick overview of current missions and facilities
2) Solar interior and helioseismology (more advanced topics)
3) Dynamics of the Earth's magnetosphere
4a) Solar observations (UKSP students)
4b) Magnetosphere-Ionosphere-Thermosphere coupling and the aurora (MIST students)
5) MHD and plasma waves: including coronal seismology
6) MHD instabilities and reconnection
7) Solar flares and activity
8) CMEs, SEPs, solar wind and space weather
9) Planetary magnetospheres: magnetic reconnection, upstream influences, ion pickup, Alfven wings, ionopause formation, induced tails, chemistry and coupling, plasma transport, stress balance
10) Plasma turbulence
11) Physics of particle acceleration
12a) Dynamo theory (UKSP students)
12b) Wave-particle interaction in the magnetosphere: including the radiation belt and ring current (MIST students)

13) Career planning

Additional Lectures

In addition to the core content above, each School will have 3/4 slots to be decided by the host for extra topics, including hands-on/interactive activities, student presentations or posters (Advanced School only). As examples, such activities could include lectures focusing on specific techniques, facilities and models, data analysis or computing exercises, grant application tutorials, presentations on outreach and research impact or sessions focusing on the development of research skills. **Organisers are recommended to consult MIST and UKSP Councils at an early stage in timetable preparation.**

Selection of Lecturers

The primary requirement is of course that lecturers should be experts in the relevant field, who can present clear and interesting talks. Organisers should pay attention to balancing seniority and institutions of speakers, and especially to having an appropriate gender balance. In the interests of efficiency of lecture preparation, it may be helpful to "recycle" some (but not all) lecturers from previous schools to speak on the same topic. We also hope that all lecturers would be prepared to share their materials with successors.

Student feedback

Organisers are expected to collect feedback from students attending the Schools, a digest of which should be passed on to the organisers for the following year, as well as to UKSP and MIST Councils to aid future planning.

Locations and Organisers

For your information, the list of the locations and organisers of the previous/current Summer Schools, and the planned locations of future courses:

	Introductory School		**Advanced School**	
Year	**Institution**	**Organiser**	**Institution**	**Organiser**
2004	*Glasgow*	*Fletcher*	*UCL (MSSL)*	*Harra*
2005	*Warwick*	*Nakariakov*	*Leeds*	*Hughes*
2006	*UCLan*	*Walsh*	*Sheffield*	*Erdelyi*
2007	*Armagh*	*Doyle*	*St Andrews*	*Hood*
2008	*Sheffield*	*Erdelyi/Jain*	*Queens Belfast*	*Mathioudakis*
2009	*UCL (MSSL)*	*Harra*	*Birmingham*	*Chaplin*
2010	*Leeds*	*Hughes*	*UCLan*	*Walsh*
2011	*St Andrews*	*Neukirch*	*Glasgow*	*Fletcher*
2012	*Armagh*	*Doyle*	*Warwick*	*Nakariakov*
2013	*Sheffield*	*Erdelyi*	*UCL (MSSL)*	*Matthews*
2014	*Imperial*	*Schwartz*	*Dundee*	*Hornig*
2015	*Glasgow*	*Kontar*	*Leeds*	*Hughes*
2016	**St Andrews**	**de Moortel**	**Sheffield**	**Erdelyi**
2017	Northumbria	Zharkova	UCLan	Walsh
2018	Exeter	Foullon	Southampton	Fear
2019	Aberystwyth	Morris	Lancaster	Arridge
2020	Birmingham	Chaplin	Warwick	Nakariakov
2021	Durham	Yeates	Reading	Dunn
2022	UCL (MSSL)	Rae	Leicester	Lester
2023	St Andrews	de Moortel	Glasgow	Kontar
2024	Sheffield	Erdelyi		