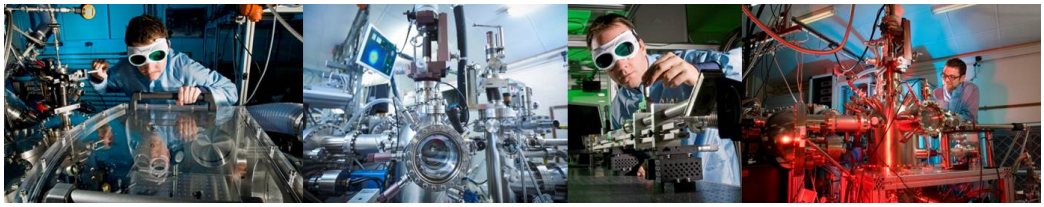

Access to the Central Laser Facility - Artemis

Beam-time application for the period April - September 2017

Applications are now invited for access to the Artemis laser facility at the Central Laser Facility, STFC Rutherford Appleton Laboratory during the period April – September 2017. A total of fourteen weeks access is available. Three weeks are available for EU and international access, provided through Laserlab Europe. The other weeks are funded by STFC, so proposals must have at least one co-investigator who is a permanent member of staff at a UK academic institution. **The deadline for applications is 7th October 2016**. Applications will be reviewed and prioritised by the Artemis Facility Access Panel.
Please read the information and instructions in the following document before applying.

Dr Emma Springate
Artemis Group Leader
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Facilities available

In this period, Artemis will offer ultrashort laser and XUV pulses, and a range of end-stations for time-resolved spectroscopy in gases, liquids and condensed matter, and for XUV imaging. The laser system is designed to provide a flexible optical set-up with widely tunable wavelengths and few-cycle pulses. Artemis end-stations include time- and angle- resolved photoemission (Tr-ARPES); gas sources with time-of-flight spectrometer or velocity-map imaging; electron time-of-flight detector for ultrafast demagnetisation experiments; in-vacuum liquid microjet; and coherent XUV imaging.

The laser and XUV pulses are generated from a Ti:Sapphire laser system producing 30 fs, 780 nm pulses, with up to 12 mJ per pulse at 1 kHz. 8 mJ can be used to pump an OPA system providing tuneable pulses in the spectral range of 235 nm – 15 μm, with an output of up to 1 mJ per pulse at 1300 nm in a 40 fs pulse. Using a hollow fibre, either 1 mJ of the laser fundamental can be compressed to ~8 fs, with 0.5 mJ per pulse or the idler at ~1.7 micron can be compressed to ~12 fs with 0.4 mJ per pulse. The remaining energy can be used as synchronized pump/probe pulses.

Any of the Artemis laser outputs can be used to generate XUV pulses through high harmonic generation. Two XUV beamlines are available – one with a monochromator for photoelectron spectroscopy and photoemission, and a high-flux XUV beamline for HHG spectroscopy and imaging.

The monochromatised XUV beamline contains:

- High harmonic generation chamber with kHz gas-jet or cw nozzle.
- A monochromator to select a single XUV harmonic in the spectral range 12 eV - 80 eV while preserving the pulse-length. The photon flux is 1.8×10^9 photons/s at 30 eV and 6×10^7 photons/s at 60 eV. The best energy resolution is 120 meV.
- Absolutely calibrated channel electron multiplier to measure the XUV flux.

- Relay imaging chamber with a toroidal mirror and optics to enable laser and XUV pulses to be recombined for pump-probe experiments.

The end-stations available on this beamline for time-resolved spectroscopy are:

- UHV chamber for time- and angle-resolved photoemission spectroscopy (tr-ARPES) equipped with a hemispherical analyser, a five-axis cryo-manipulator, a preparation chamber and a fast load lock for sample transfer.
- Atomic and Molecular Physics end-station with velocity-map imaging detector or time-of-flight electron spectrometer, a pulsed gas source and differential pumping. The chamber can be reconfigured with different gas sources.
- UHV chamber for time-resolved photoemission equipped with a low noise level electron time-of-flight analyser, magnetisation coils and MOKE. E-beam heating, ion sputtering and LEED/Auger are available for in-situ sample preparation. The system has been fully tested at 1 kHz with the XUV beamline.
- Chamber for liquid-phase studies, equipped with a liquid microjet and differentially pumped time-of-flight detector.

The high flux XUV beamline contains:

- High harmonic generation chamber with cw nozzle.
- XUV flat-field spectrometer, which can be used for HHG spectroscopy or HHG optimisation experiments.
- Coherent XUV imaging chamber with multilayer focusing mirrors and sample positioning. Filters and XUV multilayer mirrors are available for 29 nm, 17.5 nm and 13 nm.

We have very limited space for users to bring their own end-stations and breadboards. Any equipment brought to Artemis must conform to CLF safety standards.

Further details and contacts

More technical specifications can be found at www.clf.stfc.ac.uk/CLF/Facilities/Artemis/12270.aspx. We urge you to contact an appropriate Artemis staff member to discuss the requirements for your experiment prior to submission.

Artemis staff will make a technical assessment of the feasibility of your proposal and identify any potential safety issues arising from your proposed experiment. This report is passed to the Access Panel. Please make sure there are enough experimental details in your proposal to enable us to do this. In particular, please provide details of any samples and gases to be used. We will contact you before the panel meet if we identify any serious problems.

During experiments, we recommend that four people are present each day (two of whom are experienced enough to lead the work) to enable you to make the most of your time. The facility is fully supported in core hours. At evenings and weekends, the facility is operated in data collection mode with on-call support only.

For more detailed information please contact:

- Emma Springate, Artemis group leader (emma.springate@stfc.ac.uk).
- Cephise Cacho, Senior Experimental Scientist (cephise.cacho@stfc.ac.uk). Condensed matter physics experiments, monochromatised XUV beamline.
- Richard Chapman, Experimental Scientist (richard.chapman@stfc.ac.uk). HHG spectroscopy, XUV imaging, high flux XUV beamline, gas- and liquid-phase experiments.
- Adam Wyatt, Senior Ultrafast Laser Scientist (adam.wyatt@stfc.ac.uk). Laser diagnostics, few-cycle pulses.

Writing your proposal

A science case of up to three pages must be included in your proposal. You should give a clear account of the aims of the experiment and set it within the broader scientific context. Keep in mind that not all review panel members will be experts in your field. If you are using specialist samples, you should indicate their source. In your proposal, you should justify the amount of beam-time you have requested, by explaining what you aim to achieve on each week of your run and estimating the data collection time. Experiments are typically allocated 2-4 weeks of beam-time.

Please note that in making their assessment, the panel will refer to your previous track record of access to Artemis. The panel will have access to the experimental reports from your previous access periods at Artemis. Please contact emma.springate@stfc.ac.uk if you would like to update your report forms.

Submitting a proposal

Use the CLF online proposal system (https://proposal.isis.rl.ac.uk/home/) to submit an electronic application. To do this:

- If this is your first proposal, register with the online proposals system by clicking on the New Facility User button and then using your e-mail address as the Login Identifier. Please provide accurate contact details so that we can communicate with you and your co-investigators.
- If you have already registered then please check and update your information as necessary.
- On the home page, choose ‘Artemis; and then create your new proposal following the on-line instructions. For enquiries with regard to proposal submission please contact the CLF user office clf@stfc.ac.uk.
- In step 3 of the form, please list the sources of funding for the people and equipment on this project. Please include RCUK and EU grants, other national funders and industry funding. If you have funding support from RCUK, you should also describe how the proposal connects with this research.
- Upload your science case of up to 3 pages.

EU and international applicants

Access for EU and international users is provided through Laserlab Europe (www.laserlab-europe.net) Please check your eligibility at http://bit.ly/1CGrfAG. You will need to submit your proposal both though us and Laserlab Europe. To do this:

- On the CLF proposal form, flag the ‘Laserlab’ option in ‘proposed access route’ and ‘yes’ for EU access at Step #3 (Facility Access and Funding).
- Download a .pdf copy of your application to the CLF and use the Laserlab online proposal system at https://laserlab.mbi-berlin.de/access/ to submit it.
- Note that the Laserlab site asks for detailed information about your co-applicants, including their year of birth.
- At the last step, attach the .pdf copy of your proposal produced by the CLF proposal system. The Laserlab site requires that your .pdf be less than 1 MB in size.

Review criteria

Applications for time on Artemis are reviewed and prioritised by the Facility Access Panel.
Your proposal will be assessed with the following criteria:

- Absolute pre-requisite, without which an application will not be recommended for funding:
    - Scientific excellence: specific objectives of the project.
    - International competitiveness.
    - Strategic value within the Artemis programme.
- Supporting evidence which increases the confidence in a successful outcome:
    - Productivity of investigators.
    - Quality of leadership and management.
    - Suitability of institution and group.
- Additional criteria that may be considered include: potential for economic impact, training, strategic alignment to RCUK areas, facility development, and impact plan.

Please note that in making their assessment, the panel will refer to your previous track record of access to Artemis. The panel will have access to the experimental reports from your previous access periods at Artemis. Please contact emma.springate@stfc.ac.uk if you would like to update your report forms.