

# FRONT RUNNER.

## Free-electron laser FLASH World record laser flashes

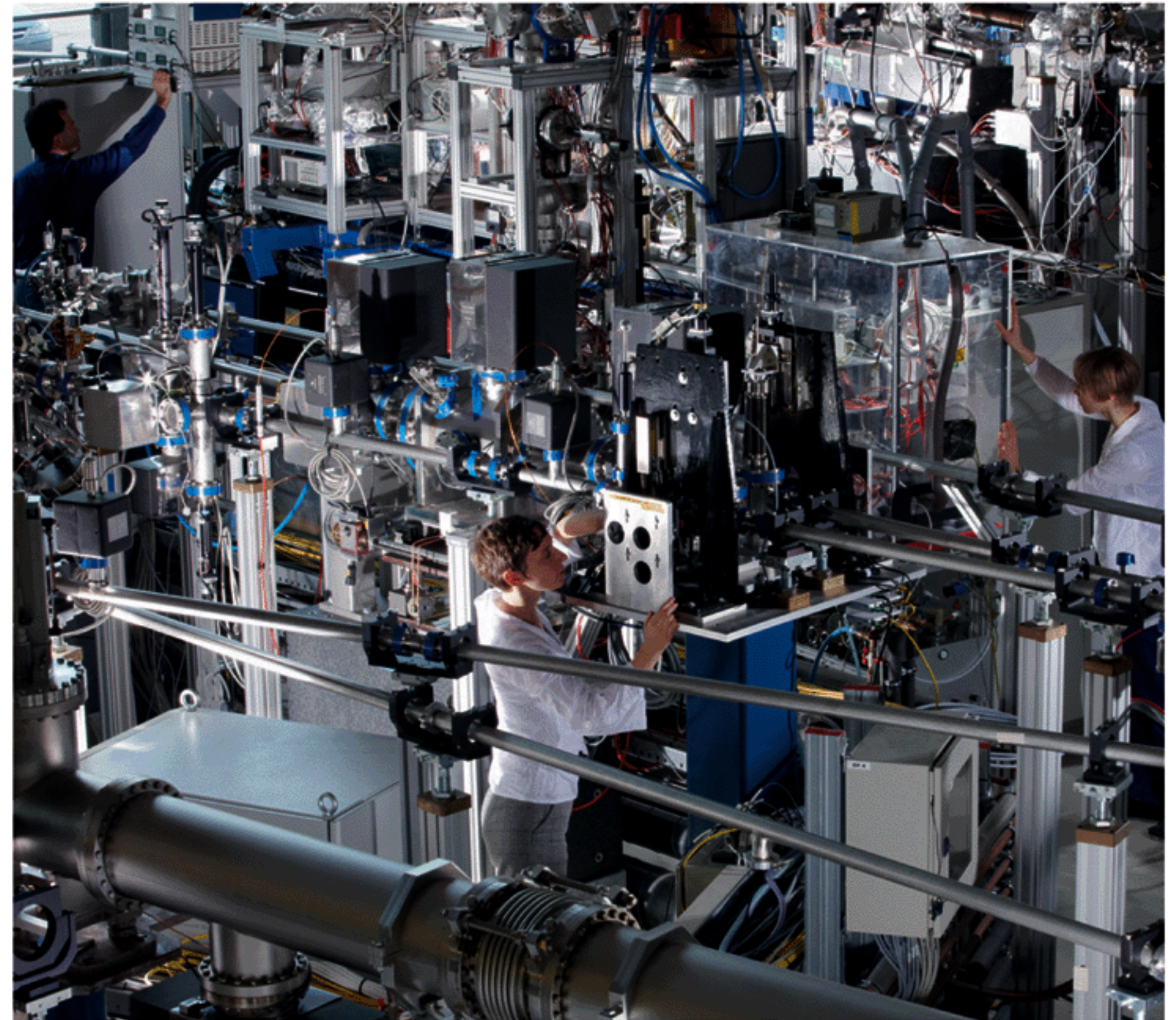
FLASH, the free electron laser (FEL) facility at DESY in Hamburg, is the first ever built FEL for the vacuum ultraviolet and soft X-ray region. It is based on a superconducting linear accelerator that produces the high-density, low-emittance electron bunches required for driving the FEL. Since 2005, FLASH provides extremely bright, coherent light pulses which can be as short as 10 femtoseconds. After two upgrades in 2007 and 2009/10, FLASH covers a spectral range from 47 – 4.1 nm wavelength, i.e. it reaches the so-called water window which allows investigating biological samples with high contrast in their aqueous environment. These unique beam properties have allowed exploring new fields of science, such as non-linear processes in atoms and molecules, ultrafast electronic and magnetic phenomena in solids, and single-pulse imaging of in-vivo biological samples or nanostructures.

The FEL beam can be switched to five beamlines, two of which are served by a high-resolution grating monochromator. On all experimental stations the FEL beam can be combined with a femtosecond optical laser beam for pump-probe experiments. In addition, one of the experimental stations can also use coherent THz pulses which are produced by the same electron bunches and are therefore perfectly synchronous with the FEL pulses.

The deadline for the submission of research proposals for 2012 is 5 June 2011.

### Contact:

- > [www.desy.de](http://www.desy.de)
- > [hasylab.desy.de](http://hasylab.desy.de)



Beamlines inside the FLASH experimental hall (Photo: Heiner Mueller-Elsner, Agentur-Focus.de)

### FLASH – Facts

- > Free-Electron Laser
- > Length: 315 metres
- > Energy: 1.25 GeV
- > Peak power: 1-3 GW
- > Wavelength: 47 - 4.1 nm (fundamental)
- > Pulse energy: up to 300µJ
- > Peak brilliance:  $\sim 10^{30}$  photons/sec/mm<sup>2</sup>/0.1%
- > 5 Beamlines
- > Start of user operation: 2005

