Eröffnungsvortrag

Großes Physikalisches Kolloquium an der Universität zu Köln

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A New Facility for Fundamental Science

Hard X-ray Free Electron (XFEL) lasers provide extremely and intense and ultra-short X-ray pulses that are ideal to investigate structural and dynamics of matter at very short time scales. X-ray free electron lasers have been in operation for 10 years now and have had wide range of areas of applications in physics, chemistry, materials and structural biology.

European XFEL is the most recent large scale research infra structure in Europe and was taken into user operation in September 2017. It is a hard X-ray free electron laser and provides a very powerful X-ray beam for research. European XFEL is an intergovernmental organization with 12 member states and is a facility that serves the European user community by providing the possibility for performing new classes of experiments to investigate the structure and dynamics of matter on the atomic length and time scales. The facility encompasses a 3.5 km long tunnel from DESY in Hamburg/Bahrenfeld to Schenefeld in Schleswig-Holstein where the experimental hall is placed. The tunnel encloses a 2 km long superconducting accelerator operated by DESY and undulator radiation sources. The first two experimental stations have been in operation doing user experiments for about one and a half years, one of them the SPB/SFX instruments for structural biology. Two more experimental stations were taken into operation end of last year. In total six instrumental stations will be in user operation by mid-2019. In the talk the basic principles of European X-FEL will be discussed and results of some of the first experiments will be shown.