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Seção
Abstracts

Ultrashort x-ray pulses production through amplified femtosecond lasers

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Resumo

The study of dynamics of ultra-fast phenomena is an interesting field of research, which has received a lot of attention from the scientific community recently due to the development of new technology that reaches the time resolution necessary for measuring this kind of phenomena. Several experiments have been made in the last years using pump and probe technics in order to observe the dynamics of materials with different scattering techniques, yet, most of these experiments are based on synchrotron sources and therefore are limited to a temporal resolution typical of those facilities - order of 100ps. The aim of this project is to produce a tabletop femtosecond x-ray source with sub-picosecond temporal resolution and high autonomy. The x-ray production occurs through the focalization of a femtosecond infra-red laser beam over a metal target, the interaction of the laser with the target results in plasma formation for a short period of time (basically the pulse duration of the the laser), which results K-alpha emission - Bremmsstrahlung. The complete setup includes optics for the laser focusing, an automated self-renewing target and several other components to ensure high autonomy and stability. The source will be able to perform pump and probe experiments using as a pump the laser source with the addition of delay lines or other pumping components such as electric or magnetic field pulse generators and using synchronization electronics. This source is currently being built at the X-ray Applied Crystallography Laboratory (LCARX) of the Physics Institute Gleb Wataghin at UNICAMP.