

Open position for postdoctoral researcher

Infrared laser beam shaping for 3D manufacturing technologies in semiconductors

LP3 laboratory, CNRS/Aix Marseille Univ., Marseille, France

Project Description

Tightly focused ultrashort laser pulses can induce confined micro-explosions inside dielectric transparent materials. Recently, this has made possible a breakthrough in material science by transforming solids into super-dense crystalline phases exhibiting unique properties. This method also encompasses current industrial processes such as laser machining since the same process can be used to create any 3D structure beneath the surface of solids. The KiSS project associating the LP3 laboratory (Marseille, France) and IFSW (Univ. Stuttgart, Germany) aims at translating this laser-material modification regime for the first time into bulk silicon and other semiconductors.

The recruited researcher will join the KiSS project. By joint efforts on new laser-material interaction schemes (LP3) and the development of novel high-power infrared laser solutions (IFSW), the goal is to develop a solution which will integrate temporal and spatial shaping of the pulses so that the characteristics of the beams can be precisely adjusted (on-demand) to enhance laser conditions inside semiconductors and access this micro-explosion regime for 3D writing applications. The accessible new degree of control will be validated by time-resolved studies of achievable conditions and properties inside silicon. Large volume processing capabilities will also be targeted with developments compatible for high-throughput and industrially relevant demonstrations.

The final demonstrator from the KiSS project, unique at the international level, must open new and exciting opportunities for generalized explorations of semiconductor materials transformed by laser-driven micro-explosions. We expect also technological demonstrations as for instance the direct writing of microfluidic cooling circuits inside silicon chips and/or high-precision dicing methods.

Your qualifications. We are looking for a highly motivated and independent scientist interested in laser science and technologies, ultrafast optics, beam shaping technologies, infrared optics, semiconductor and/or material processing. Applicants should have demonstrated expertise in laser matter-interaction, strong-field optics or photon-based materials science. Excellent spoken and written English is mandatory.

Conditions of appointment. We offer up to 2 years (1 year renewable) of appointment according to the salary scheme of CNRS (French National Center for Scientific Research). Salary depends on experience.

Mode of application. To apply, please send an email to David Grojo, david.grojo@univ-amu.fr and/or Pol Sopena, pol.sopena-martinez@univ-amu.fr including a detailed CV (including a brief description of research interests, previous employments, and publication list), and contact details of at least two references (letters of recommendation are optional at this stage).

Application deadline is continuous until positions have been filled.

Job start is flexible and can start at any time from March, 2024.

Mobility. Possible stays at Stuttgart Univ. (Germany) to conduct experimental campaigns.