Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

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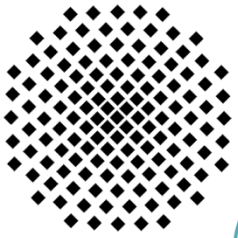

Dienstag, 25. November 2014	17:15 Uhr	Hörsaal V 57.01

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Novel ultrafast semiconductor lasers

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Abstract

SESAM modelocked VECSELs and MIXSELs are attractive semiconductor laser sources that deliver ultrashort laser pulses with picosecond and femtosecond pulse durations in combination with watt-level average output power levels in the gigahertz repetition rate range. The excellent beam quality and low-noise performance makes them highly attractive for several applications where they can replace conventional complex ion-doped diode-pumped solid-state lasers. The VECSEL and MIXSEL is part of the family of VCSELs which are the most frequently manufactured semiconductor lasers today. In contrast to a VCSEL a VECSEL (i.e. vertical-external-cavity surface-emitting laser) has an external cavity and is either optically or electrically pumped. The optically pumped VECSEL is a successful commercial device produced by Coherent (i.e. OPSL). The MIXSEL (i.e. modelocked integrated external-cavity surface emitting laser) combines the gain of VECSELs with the saturable absorber of a semiconductor saturable absorber mirror (SESAM) in a single semiconductor device. Hence, self-starting and stable passive modelocking is obtained in a simple straight cavity formed by the semiconductor chip and a curved output coupler. This talk will give an overview of the recent advances in SESAM and graphene modelocked VECSELs, high-power picosecond and femtosecond MIXSELs, their excellent noise performance, frequency comb generation and optical and electrical pumping. Such sources have a great potential for the future vision of natural user interfaces (NUI).