Stuttgarter Physikalisches Kolloquium

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

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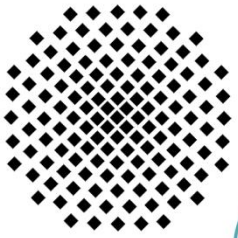

Dienstag, 24. November 2020	16:15 Uhr	Online-Vortrag

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Jun.-Prof. Dr. Stefan Kaiser, Universität Stuttgart, Telefon: 0711 - 6891775

Light-induced dynamics in superconductors and atoms

Ludwig Mathey
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Abstract

Inducing and controlling many-body systems via light extends the methodology for the design of materials and functionalities in a profound manner. In this talk, I will present our proposal to induce a time crystalline state in a high Tc superconductor. This realization constitutes the creation of a dynamically induced state that has a genuine non-equilibrium order with no equilibrium counterpart, and utilizes a sum resonance of the plasma frequency and the Higgs frequency of the superconductor. Secondly, I will present a mechanism for light-enhanced superconductivity that utilizes parametric enhancement via the Higgs mode. This proposed mechanism induces a periodic collective motion of the Higgs mode, which in turn acts as a parametric amplifier of the conductivity of the material. Finally, I will present our proposal for demonstrating parametric control of conductivity in a cold atom system, which imitates our proposed mechanism for parametrically enhanced superconductivity. We propose to probe the conductivity of an atomic Josephson junction, composed of two weakly coupled condensates, and to enhance or suppress the low-frequency regime of the conductivity, which provides a direct confirmation of this mechanism in a cold-atom environment.