Karlsruher Institut für Technologie

Fakultät für Physik

Physikalisches Kolloquium

Reinhold Kleiner, Universität Tübingen

»Inside the THz gap – intrinsic Josephson junctions in high temperature superconductors«

Einführung: A. Ustinov

Having small sized active and tunable devices operating at frequencies up to the Terahertz (THz) range is one of the goals of modern electronics. However, there is still a lack of good active or passive devices, often referred to as the "Terahertz gap". Such devices would open a window to applications like nondestructive imaging for materials testing or medical diagnosis, or to novel spectroscopic studies of materials and molecules [1,2]. Intrinsic Josephson junctions formed by the layered crystal structure of high temperature superconductors such as $Bi_2Sr_2CaCu_2O_8$ have the potential to operate in this regime [3]. While for a long time the research on THz generation with this type of junctions was carried out with perhaps only modest success, recently a significant output power was reported [4,5]. In this talk, after an introduction into the physics of Josephson junction oscillators and the physics of intrinsic Josephson junctions, I will discuss recent experiments on THz generation and the status of theoretical interpretations.

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