



Weekly Seminar

Terahertz semiconductor-based frequency combs

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Time: 4: 00 pm, Oct. 9, 2019 (Wednesday)

时间: 2019年10月9日 (周三) 下午4:00

Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Optical frequency combs, consisting of well-controlled equally-spaced frequency lines, have been widely used in precision spectroscopy and metrology. Extending the comb frequency from infrared to terahertz regime is of great importance for practical applications due to the fact that many strong absorption lines (“finger prints”) of molecules are located in the terahertz frequency range. The electrically-pumped quantum cascade laser (QCL) with high output power, narrow far-field beam, and wide frequency coverage is the ideal candidate for generating frequency combs in the terahertz range. In this work, I will review the progress of QCL-based frequency combs and present what we have done to improve the mode coherence of terahertz QCL combs. Finally, towards the practical applications, we successfully implement the compact and real-time multiheterodyne dual-comb spectroscopy based on two terahertz QCL combs. The optical coupling, detection and locking mechanisms, of the multiheterodyne dual-comb operation are discussed in detail.

About the speaker

黎华, 研究员, 博士生导师。2009年于中科院上海微系统与信息技术研究所取得工学博士学位, 随后在德国慕尼黑工大、日本东京大学、法国巴黎七大从事博士后研究工作, 于2015年回中科院上海微系统与信息技术研究所, 任“百人计划”研究员。主要研究方向包括太赫兹半导体激光器、太赫兹/中红外光频梳、半导体锁模激光器、成像与光谱检测应用等。曾获得国家人社部留学人员择优资助、上海市自然科学奖二等奖、中国电子学会“优秀科技工作者”、德国洪堡学者、日本学术振兴会(JSPS)奖学金等。作为负责人主持国家科技部973课题、国家自然科学基金、JWKJW、中科院“0到1”原始创新和“百人计划”人才项目等。