**报告题目：Transient excitons at metal surfaces – Fact or fiction?**



**报告人：**Prof. Hrvoje Petek

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**报告人介绍：**

Hrvoje Petek obtained BS and PhD degrees in Chemistry from MIT and U. C. Berkeley. From 1985 he worked as a Postdoctoral Fellow and Research Associate at the Institute for Molecular Science, in Japan. Subsequently, from 1993 he became a Group Leader at Hitachi Advanced Research Laboratory, in Saitama, Japan. In 2000, he took his current appointment at the University of Pittsburgh as a Professor of Physics, and Chemistry.

His research is focused on surface femtochemistry, ultrafast microscopy, plasmonics, surface and molecular electronic structure, single molecule machines, and all aspects of ultrafast carrier and lattice dynamics in solids and solid surfaces. Petek is a Fellow of the American Physical Society, and has received the Alexander von Humboldt Award from Germany. Since 2006, he has been the Editor-in-Chief of Progress in Surface Science.

**报告摘要：**

On account of high electron density, the Coulomb interaction in metals is efficiently screened on the length scale of interatomic distance and the time scale of inverse plasma frequency, i.e., on Ångstrom and attosecond scales. Nevertheless, transient excitonic interactions have been invoked in the interpretation of optical spectra and electron dynamics in noble metals. We explore the surface electronic structure of silver and copper surfaces by energy, momentum, and time-resolved multiphoton photoemission. Features observed in the near-resonant multi-photon photoemission spectra cannot be understood from the joint density of occupied and unoccupied states that are coupled by optical transitions and a Fermi Golden Rule transition rate formalism, suggesting that quasiparticle correlations, for example, transient excitonic interactions can play an important role. We study photoexcited electron and hole propagating in the occupied and unoccupied surface states, and how their mutual Coulomb interaction affects the transition amplitudes, as well as photoelectron energy and momentum distributions in multi-photon photoemission spectra. Photoelectron energy-momentum distributions provide clear evidence for electron-hole pair correlation, local field effects, and related excitonic and plasmonic interactions, on the time scales for screening in noble metals.

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**报告地点：理科楼物理系三层报告厅**