

2012年9月14日 (星期五)
频标楼3楼报告厅
上午10:30 - 12:00



傅立斌研究员

甘肃成县人，洪堡学者。北京应用物理与计算数学研究所研究员。1994年兰州大学物理系理论物理专业本科毕业，并保送直接攻读博士学位。1999年获得博士学位。1999年至2001年在北京应用物理与计算数学研究所做博士后。2001年入北京应用物理与计算数学研究所非线性中心工作，受聘副研究员。2005年破格晋升为研究员。期间，先后访问香港浸会大学非线性中心、新加坡国立大学工程计算系、澳大利亚国立大学非线性物理系、香港中文大学物理系及理论物理所合作研究。2003年至2004年，作为洪堡学者在德国马克思—普郎克物理复杂系统研究所访问工作一年。2003年获教育部自然科学二等奖(排名第六)。

理论与交叉学术交流系列报告 (十六)

SEMICLASSICAL MODELING OF NONSEQUENTIAL DOUBLE IONIZATION OF ATOMS WITH LINEARLY and CIRCULARLY POLARIZED INTENSE LASER FIELDS

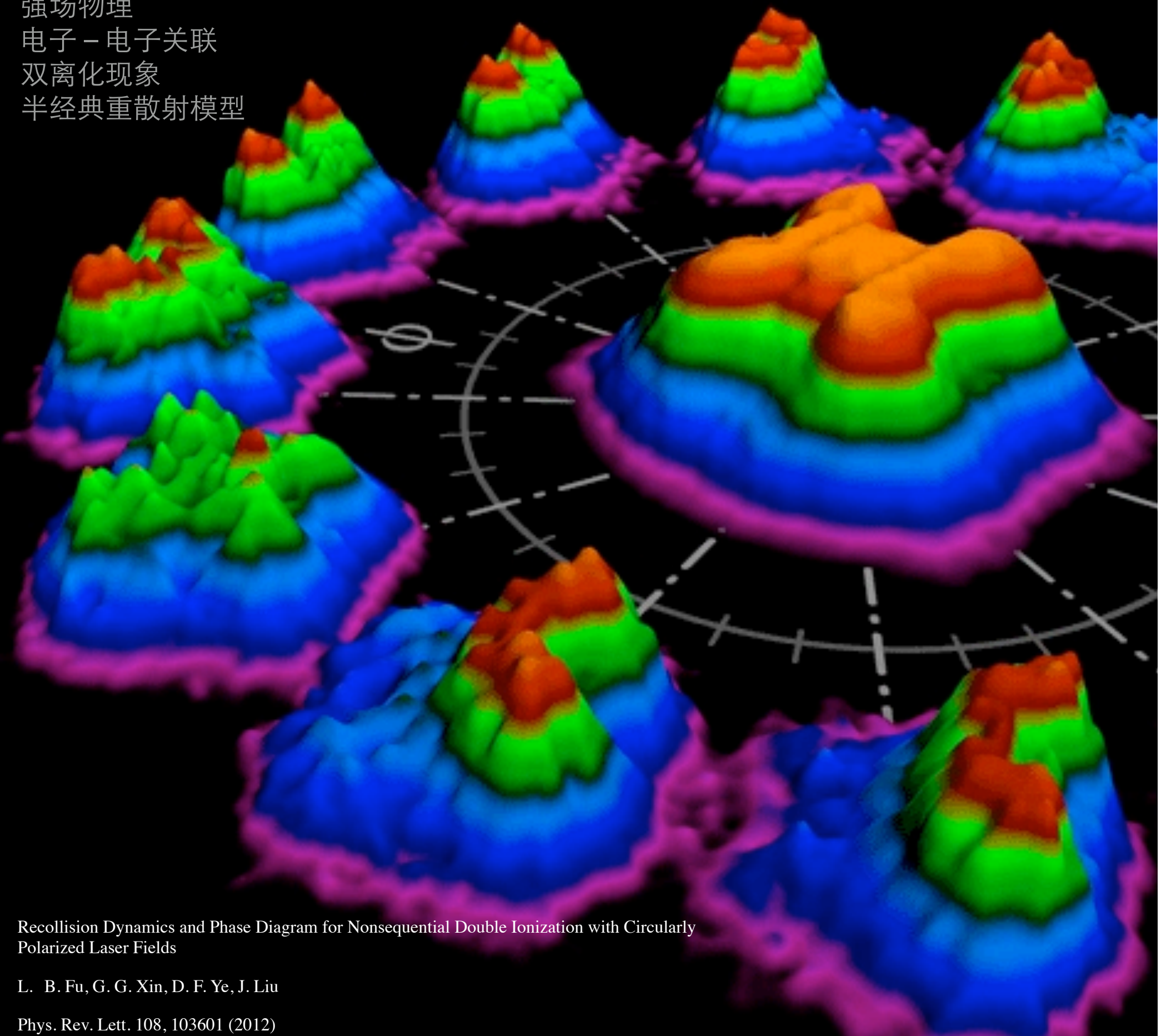
报告关键词:

强场物理

电子-电子关联

双离化现象

半经典重散射模型



Recollision Dynamics and Phase Diagram for Nonsequential Double Ionization with Circularly Polarized Laser Fields

L. B. Fu, G. G. Xin, D. F. Ye, J. Liu

Phys. Rev. Lett. 108, 103601 (2012)

激光和原子之间的相互作用包含无尽的物理

SEMICLASSICAL MODELING OF NONSEQUENTIAL DOUBLE IONIZATION OF ATOMS WITH LINEARLY and CIRCULARLY POLARIZED INTENSE LASER FIELDS

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Within the strong-field physics community, there has been increasing interest on nonsequential double ionization (NSDI) induced by electron-electron correlation. A large variety of novel phenomena has been revealed in experiments during the past decades. However, the theoretical understanding and interpretation of this process is still far from being complete. The most accurate representation of the process, i.e., the exact solution of the time-dependent Schrodinger equation for two electrons in a laser field is computationally expensive. In the present talk, we report our recent works of applying semiclassical rescattering model to investigate NSDI of atoms. In our model, we treat the tunneling ionization of the outmost electron quantum mechanically according to the ADK theory, sample the inner electron from microcanonical distribution and then evolve the two electrons with Newton's equations. With this model, we have successfully explained various NSDI phenomena, including the excessive DI yield, the recoil momentum distribution of doubly ionized ions, the momentum correlation between two emitted electrons, the energy spectra and angular distribution of photoelectrons. The model calculation reproduces the experimental results for magnesium and explains the apparently conflicting experimental results in terms of an analytical formula that demarcates the phase diagram for the nonsequential double ionization in circularly polarized laser fields. The obvious advantage of our model is that it gives time-resolved insights into the complex dynamics of NSDI, from the turn-on of the laser field to the final escape of the electrons, thus allows us to disentangle and thoroughly analyze the above-stated mechanisms.