Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Electronic correlations in double ionization of atoms in pump probe experiments SEBASTIAN BAUCH, KARSTEN BALZER, MICHAEL BONITZ, Institut fuer Theoretische Physik und Astrophysik, Leibnizstrasse 15, D-24098 Kiel, Germany — The (correlated) dynamics of few-body systems in strong laser fields is in focus of active research since the last two decades. One example is the famous non-sequential double ionization of Helium. With nowadays experimentally available tools it is possible to investigate these processes on the sub-femtosecond timescale. Typically, a short extreme ultraviolet (XUV) pump pulse is combined with a longer infrared (IR) probe pulse. We present theoretical results based on the time-dependent Schrödinger equation for such a pump-probe experiment involving two active electrons [1]. A dramatic change of the double ionization yield with variation of the pump-probe delay is reported. We identify the governing role of electron-electron correlations, through a complex interplay of (1) inner-atomic electron shake up and (2) rescattering with subsequent impact ionization. Our results allow for a direct control of the double ionization yield, and the relative strength of double and single ionization.

[1] S. Bauch, K. Balzer and M. Bonitz, Europhys. Lett. 91 53001 (2010)

Sebastian Bauch
Institut fuer Theoretische Physik und Astrophysik,
Leibnizstrasse 15, D-24098 Kiel, Germany

Date submitted: 04 Feb 2011 Electronic form version 1.4