
MP 8: Quantum Mechanics and Many Particle Systems I

Zeit: Dienstag 15:55–16:15

Raum: 30.45: 201

MP 8.1 Di 15:55 30.45: 201

Strong-field-QED effects in an optical lattice — ●NIKODEM SZPAK — Fakultät für Physik, Universität Duisburg-Essen

We present a model describing cold atoms in an optical lattice which shows phenomena known from the strong field QED (spontaneous pair creation, Schwinger effect). The main advantage of that analogue sys-

tem is experimental accessibility of the strong field regime in contrast to the real QED. Formulation of the model requires a new derivation of an effective Fermi-Hubbard Hamiltonian from first principles of the (many-body) quantum field theory. We shall present main steps of the derivation followed by examples of the analogue QED effects appearing on the lattice obtained by analytical and numerical methods.