FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 27.10.2016, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Prof. Hartmut Ruhl

(LMU München)

The radiation reaction force and the problem of mass

The focus of this talk is on an outline of how to obtain dynamical quasi-particle frameworks from first principles. Starting from the Dirac equation coupled to a gauge field for radiation, a set of equations of motion for charged quasi-particles is derived in the classical limit for slowly varying radiation and matter fields. The approach outlined in the talk allows the derivation of different versions of radiation reaction forces. While the traditional Abraham-Lorentz-Dirac force can be obtained there is also a way to motivate delay equations for radiation reaction from first principles. While the latter do not suffer from the setbacks of Abraham-Lorentz-Dirac, they violate the on-shell constraint of real electrons and positrons. In the new context particles resemble hyper-tubes in space-time and they acquire their mass in the course of their interaction with the gauge field.

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