

**FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING**

**PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING**

MLL-KOLLOQUIUM

Donnerstag, 10.05.2012, 16¹⁵ Uhr

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

Dr. Rodolfo Bonifacio

University of Strathclyde, Glasgow/Scotland, UK

Quantum Effects in Compton Backscattering

The spontaneous emission by a relativistic electron beam in a Laser wiggler is described as a Compton back-scattering process. If the electron's energy is much larger than the photon energy, the Compton frequency shift can be neglected. However, the randomness of photon emission originates an electron's Compton random recoil which we model by a finite difference equation for the distribution of the number of the emitted photons and for the electron's momentum recoil. We find that the first is a Poisson distribution as in a coherent field. The second evolves according to a continuous drift-diffusion equation, provided the energy spread of the electron beam is larger than the single photon energy. In the opposite limit, the momentum distribution is made up by discrete lines equally spaced by the photon momentum. The possibility of observing this novel quantum effect in the ELI facility (Extreme Light Infrastructure) is discussed.

gez. Peter Thirolf
Tel. 289-14064

gez. Norbert Kaiser
Tel. 289-12367