MP 1: Poster (permanent Tue-Thu)

Zeit: Dienstag 8:30–18:30   Raum: 30.45: 201

MP 1.1   Di 8:30   30.45: 201

Dynamics of spontaneous emission of light in the 2P→1S transition in hydrogen — ●Piotr Marecki and Nikodem Szpak — Fakultät für Physik, Universität Duisburg-Essen

In the presentation we will report on the model of spontaneous emission which we have developed in 2005 [Annalen der Physik, 14, 428]. In the model a non-relativistic quantum system (an electron in a hydrogen atom) interacts via a linear term with the quantized radiation field. This model has no free parameters which could be adjusted. Recently we have finally reached a (surprisingly good) agreement between the predicted decay rate and the one observed in experiments for the 2P→1S decay in hydrogen in the presence of an initial vacuum state of the radiation field. For a long time, the predicted decay rate was too small and the mistake was finally found in the normalization of the quantum field (numerical factor standing in front of the Pauli-Jordan function). This again showed that the problem is one of the few precious examples where the structure of the theory allows for no room for adjustments and the agreement (on the level of few percent) is surprising (the electron is treated non-relativistically). In the poster, we will comment upon a large number of unnecessary problems present in the unusually obscure literature on the subject. In the end, the Laplace transform of the decay amplitude is shown (numerically) to possess only a single pole which dominates the dynamics (although the situation could have been much worse); corrections to the exponential law, albeit very small, come from the single cut in the complex plane.