

SEMINARIO

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Relativistic quantum mechanics of two-fermion systems

Abstract: The relativistic quantum mechanics of two interacting fermions is considered. The covariant kinematics is formulated, together with a short discussion of the puzzle of the relative time and of the phase space reduction. Some classical results are outlined. The spectrum of the quantized free system and the spherical solutions are studied. The interactions with general scalar and vector potentials are then introduced and the explicit equations are deduced, showing their one particle and non-relativistic limits. The guidelines for the solution of the boundary value problem are described. The numerical results for the hyperfine spectrum of Hydrogen-like atoms and for meson masses in the quarkonium model is presented. Finally the previous systems are coupled to an external electromagnetic field and the rates of the radiative decays of atoms and mesons are calculated.

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