On the Existence of Additional (Hydrino) states in the Dirac and Proca equations

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In case of spinless particles there appear additional (singular) solutions in the framework of relativistic Klein-Gordon equation for Coulomb potential [1-2]. These solutions obey to all requirements of quantum mechanical general principles. Observation of such states ("hydrino, small hydrogen") should be important for manifestation of various physical phenomena.

In this talk the same problem is considered for spin-1/2 particle (electron) in the Dirac equation. It is shown that such kind of solutions really occurs, but the rate of singularity is more higher than in spinless case. By this reason we have no time- independence of total probability (norm). Moreover the orthogonality property is also failed, while the total probability is finite in the certain area of the model-parameters. Therefore we are inclined to conclude that this additional solution in the Dirac equation must be ignored and restrict ourselves only by normal (standard) solutions. Existence of additional states is also considered in the Proca equation

References

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