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Two Photon and Radiation-less Decay of Positronium Molecule

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It has been known for many years that an electron and its antiparticle, the positron, may together form a metastable hydrogen-like atom, known as positronium or Ps. In 1946, Wheeler speculated that two Ps atoms may combine to form the positronium molecule (Ps₂) stable with respect to auto-dissociation. In 2007 the existence of Ps₂ was confirmed experimentally.

I will present a determination of the radiation-less and two photon decay rates of Ps₂. We employ a simple technique to compute the amplitudes and write the products of spinors in terms of gamma matrices, which reduces the computational time and provides more insights into the physics of a reaction. After testing the method with the well known problem of positronium, I will demonstrate that the previously published results are incorrect.

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Please select: Experiment or Theory

Theory

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