

UCLA NUCLEAR PHYSICS SEMINAR

Open string QED meson description of X17, E38, and dark matter

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A quark and an antiquark interact not only with the quantum chromodynamical (QCD) interaction but also with the quantum electrodynamical (QED) interaction. As a consequence, a quark-antiquark pair can form QED bound states in QED, analogous to the QCD meson states in QCD [1]. The predicted masses of the neutral isoscalar and isovector quark-antiquark QED meson states [1,2] are close to the masses of the X17 and E38 particles observed recently at about 17 and 38 MeV, respectively. The matching of the masses leads to the suggestion that these particles may be the quark-antiquark QED meson states arising from the quantum electrodynamical interaction between a quark and an antiquark. The implication of the possible existence of such QED meson states on the occurrence of anomalous soft photons in high-energy hadron production, the dark matter, and the production of the primordial dark matter during the quark-gluon plasma phase transition at the early history of the universe will be discussed.

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