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Pseudo-Dirac Gluino Oscillations

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In the existence of a slightly broken $U(1)$ symmetry, two (2-component) Weyl spinor parts of a Dirac fermion is split by a small Majorana mass. These fermions are called pseudo-Dirac fermions. The mass splitting gives rise to oscillations between the charge eigenstates, much like neutral meson oscillations. Previously, these oscillations have been considered in mesino - anti-mesino systems. Here we consider pseudo-Dirac gluino oscillations. Pseudo-Dirac gluinos are a feature of some SUSY models with an approximate $U(1)_R$ symmetry. We show that there can be $\mathcal{O}(1)$ CP violation if the decay rate of gluinos are comparable to the oscillation rate. This CP violation can be observed as a like-sign dilepton asymmetry.

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