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Can Lorentz-breaking fermionic condensates form in large N strongly-coupled LGT?

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The possibility of Lorentz symmetry (spontaneous) breaking (LSB) has attracted considerable attention in recent years for a variety of reasons, including the attractive prospect of the graviton as a Goldstone boson. Though a number of effective field theory analyses of such phenomena have recently been given it remains an open question whether they can take place in an underlying UV complete theory. Here we consider the question of LSB in large N lattice gauge theories in the strong coupling limit. We apply techniques that have previously been used to correctly predict the formation of chiral symmetry breaking condensates in this limit. Generalizing such methods to other composite operators we find that certain LSB condensates can indeed form. In addition, the interesting possibility arises of condensates that 'lock' internal with external symmetries. The implications of such phenomena for the construction of quantum gravity theories are briefly discussed.

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talk

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