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Interference of nematic quantum critical quasiparticles: a route to the octet model EUN-AH KIM, Cornell University, MICHAEL LAWLER, Binghamton University & Cornell University — Given the presence of glassiness and inhomogenaity in cuprate superconductors, the capability of quasiparticle interference (QPI) in inferring momentum space electronic structure from real space local density of states(LDOS) images is surprising. Particularly, the simplicity of the QPI image, a set of well defined dispersing peaks is striking. Regarding the nature of QPI peaks, the "octet model" was based on the observation that the peak positions are determined by the eight tips of the "banana" shaped qp equal energy contours. However, a key open question has the mechanism for the accumulation of coherence at the tips. Here we show that nematic quantum critical fluctuations, combined with the known extreme velocity anisotropy, provide a natural mechanism for the accumulation of coherence at those special points [1]. Our results raise the intriguing question of whether the nematic fluctuations provide the unique mechanism for such a phenomenon.

[1] E.-A. Kim and M. J. Lawler, arXiv:0811.2242.

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