

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The effect of screening on excitonic condensation in double-layer graphene¹ CHRISTOPHER JAMELL, YOGESH JOGLEKAR, Indiana University-Purdue University at Indianapolis — A double-layer graphene system - where two layers of graphene are embedded in a dielectric and are separated by a distance d - is expected to support ground states with interlayer coherence. In particular, when one layer has electrons as carriers and the other has holes, the system supports a uniform excitonic condensate ground state. We investigate the effect of screened electron-electron interaction on the formation and the strength of excitonic condensation using complementary momentum-space and real-space mean-field analyses. We obtain the dependence of the excitonic order parameter Δ_k , quasiparticle energy dispersion E_k , and the quasiparticle density-of-states on the screening-length and the interlayer distance. By focusing on the momentum-dependence of the excitonic order parameter Δ_k , we point out the differences between our results and those obtained in the literature.

¹Christopher Jamell was supported by the National Science Foundation GAANN Fellowship

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Date submitted: 17 Dec 2009

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