Excitonic supersolid in quantum Hall graphene bilayers\textsuperscript{1} YOGESH JOGLEKAR, Indiana University- Purdue University Indianapolis (IUPUI), CHANG-HUA ZHANG, Kansas State University — We study the ground state of two graphene sheets separated by a distance \(d\) in the quantum Hall regime where the top layer has electrons and the bottom layer has holes as carriers. We obtain a rich mean-field phase diagram as a function of distance \(d\) and the partial filling factor \(\nu_e = \nu_h = \nu\) for different Landau levels. We find that the ground state in high Landau levels at large \(d\) is a generalized Wigner crystal that includes anisotropic stripe and bubble states, and at small \(d\) the ground state is a uniform excitonic condensate. We show that for a wide range of partial filling factors \(0 \leq \nu \leq 1/2\), at intermediate values of \(d\), the ground state has interlayer phase coherence as well as a lattice structure, i.e. it is an excitonic supersolid. We discuss the predictions for signatures of such a state in transport and optical experiments.

\textsuperscript{1}This work was supported by IUPUI Research Support Fund Grant

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Date submitted: 20 Nov 2008