Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Effective chiral description of an exciton-polariton superfluid in one and two dimensions MANAS KULKARNI, GERMAN KOLMAKOV, Department of Physics, New York City College of Technology, City University of New York — There has been remarkable experiments recently on capturing hydrodynamic features of exciton-polariton condensates in optical microcavities which have potential implications for quantum and optical computing and information technologies. We present an effective chiral description for such one and two dimensional systems. This description captures the fingerprints of hydrodynamics, namely, nonlinearity, dispersion and dissipation. The resulting chiral equation for the condensate perturbation wave dynamics is found to be of the generalized-KdV-type. We describe the phenomenon of polariton shock waves, solitons and defects in such systems. Our mapping is expected to have broad implications for other systems and can further help one in engineering a delicate balance between the pump and damping to produce stable optical signals propagating in polariton circuits.

Manas Kulkarni
Department of Physics, New York City College of Technology, City University of New York

Date submitted: 06 Nov 2015 Electronic form version 1.4