Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Symmetries and stability of chimera states in small, globally-coupled networks** JOSEPH D. HART, Department of Physics, University of Maryland, College Park, KANIKA BANSAL, Department of Mathematics, University at Buffalo, SUNY, NY  US Army Research Laboratory, Aberdeen Proving Ground, MD, THOMAS E. MURPHY, Department of Electrical and Computer Engineering, University of Maryland, College Park, RAJARSHI ROY, Department of Physics, University of Maryland, College Park — It has recently been demonstrated that symmetries in a network's topology can help predict the patterns of synchronized clusters that can emerge in a network of coupled oscillators. This and related discoveries have led to increased interest in both network symmetries and cluster synchronization. In parallel with these discoveries, interest in chimera states—dynamical patterns in which a network separates into coherent and incoherent portions—has grown, and chimeras have now been observed in a variety of experimental systems. We present an opto-electronic experiment in which both chimera states and synchronized clusters are observed in a small, globally-coupled network. We show that the symmetries and sub-symmetries of the network permit the formation of the chimera and cluster states. A recently developed group theoretical approach enables us to predict the stability of the observed chimera and cluster states, and highlights the close relationship between chimera and cluster states as belonging to the broader phenomenon of partial synchronization.

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Date submitted: 11 Nov 2016 Electronic form version 1.4