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Confinementr and deconfinement of topological excitations in Na_2IrO_3 ZHANYBEK ALPICHSHEV, FAHAD MAHMOOD, Massachusetts Institute of Technology, GANG CAO, University of Kentucky, NUH GEDIK, Massachusetts Institute of Technology — Using phase sensitive heterodyne transient grating technique we establish that in the limit of low pumping fluences the optical response of Na-213 iridate system below the antiferromagnetic ordering temperature T_N is dominated by Hubbard excitons (HE). Unpaired single particle excitations (SE) constituting HE are strongly suppressed, appearing only above T_N. We argue that this is due to the interplay between the frustrated Kitaev term in the Hamiltonian and the weak Heisenberg term responsible for the antiferromagnetic order below T_N, which mediates an effective interaction between spin singlet SE excitations. This interaction grows linearly with distance resulting in a sudden increase of the exciton binding energy as the system enters the ordered state. This is a solid state realization of a phenomenon known in high energy physics as confinement.

Zhanybek Alpichshev
Massachusetts Institute of Technology

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