

Abstract Submitted
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Probing the excitations of a one dimensional topological Bose insulator EMANUELE G. DALLA TORRE, Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot, 76100, Israel, EREZ BERG, Department of Physics, Stanford University, Stanford, CA 94305-4045, USA, EHUD ALTMAN, Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot, 76100, Israel — We investigate the dynamic response of a system of ultracold dipolar atoms or molecules in the one dimensional Haldane Bose insulator phase. This phase, which was recently predicted theoretically [1], is characterized by non-local string order and its elementary excitations are domain walls in this order. We compute experimentally relevant response functions and we derive asymptotically exact expressions near the quantum critical points separating the Haldane insulator from the conventional Mott and density wave insulators. In particular, we predict a narrow absorption peak in Bragg spectroscopy experiments, due to the excitation of a single domain wall in the string order.

[1] E.G. Dalla Torre, E. Berg, E. Altman, *Phys. Rev Lett.* **97**, 260401 (2006)

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