

Abstract Submitted  
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**The Prediction of a Gapless Topological “Haldane Liquid” Phase in a One-Dimensional Cold Polar Molecular Lattice**<sup>1</sup> JASON KESTNER, BIN WANG, JAY SAU, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, MD — We show that ultracold two-component fermionic dipolar gases in an optical lattice with strong two-body on-site loss can be used to realize a tunable effective spin-one model. Fermion number conservation provides an unusual constraint that  $\sum_i (S_i^z)^2$  is conserved, leading to a novel topological liquid phase in one dimension which can be thought of as the gapless analog of the Haldane gapped phase of a spin- one Heisenberg chain. The properties of this phase are calculated numerically via the infinite time-evolving block decimation method and analytically via a mapping to a one-mode Luttinger liquid with hidden spin information.

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