

Abstract Submitted  
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**Interplay of Quantum Criticality and Geometric Frustration in Columbite**<sup>1</sup> SUNGBIN LEE, University of California, Santa Barbara, RIBHU KAUL, Microsoft Station Q, LEON BALENTS, Kalvi Institute for Theoretical Physics, BALENTS TEAM — Motivated by  $\text{CoNb}_2\text{O}_6$  (belonging to the columbite family of minerals), we theoretically study the physics of quantum ferromagnetic Ising chains coupled anti-ferromagnetically on a triangular lattice in the plane perpendicular to the chain direction. We combine exact solutions of the chain physics with perturbative approximations for the transverse couplings. When the triangular lattice has an isosceles distortion (which occurs in the real material), the  $T = 0$  phase diagram is rich with five different states of matter: ferrimagnetic, Néel, anti-ferromagnetic, paramagnetic and incommensurate phases, separated by quantum phase transitions.

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