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Quasi-one-dimensional spin nematic states and their excitations[1]

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Much of the research in frustrated quantum magnets has focused on the elusive quest for magnetically disordered phases with highly entangled ground states - quantum spin liquids. Somewhat intermediate between these rare beasts and commonplace antiferromagnets are moderately exotic phases of antiferromagnets in strong magnetic fields which exhibit no dipolar magnetic order transverse to the field, contrary to typical spin-flop antiferromagnetic states. I describe excitation spectra and dynamical response functions of two such phases - collinear spin-density wave and spin nematic. Both of these unusual phases are characterized by the presence of a gap to $S^z = \pm 1$ excitations, but differ qualitatively in details of low-energy longitudinal (density like) response. I conclude the talk by describing high relevance of these two phases to the kagome antiferromagnet Volborthite.

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