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Spin excitations in the two dimensional antiferromagnet $\text{Na}_2\text{BaMn}(\text{PO}_4)_2$

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The study of geometrically frustrated systems with antiferromagnetically ordered spins on a two-dimensional lattice has recently gained considerable attention for their exotic quantum magnetic properties. In order to explore effects related to quantum magnetism we recently focused our attention to $\text{Na}_2\text{BaMn}(\text{PO}_4)_2$. So far previous works on the isostructural $\text{Na}_2\text{BaCo}(\text{PO}_4)_2$, a Co spin-1/2 compound [1], and on the $\text{Na}_2\text{BaNi}(\text{PO}_4)_2$, a Ni spin-1 compound [2], have showcased intriguing phenomena close to quantum criticality.

Using inelastic neutron scattering measurements performed at a cold triple axis spectrometer we determine the magnetic propagation vector and the low energy spin excitations of $\text{Na}_2\text{BaMn}(\text{PO}_4)_2$ at mK temperatures. We compare our results with the Co and Ni counterparts and we find similarities not only in the temperature-magnetic field (H-T) phase diagrams, but also in the spin excitation spectra.

[1] J. Sheng et al., Proc. Natl. Acad. Sci. U.S.A. 119, 51 e2211193119 (2022).

[2] Jieming Sheng, et al. arxiv:2306.09695 (2023).

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