

Abstract Submitted  
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**Nematic spin fluid in the tetragonal phase of BaFe<sub>2</sub>As<sub>2</sub>** LELAND HARRIGER, University of Tennessee, HUIQIAN LUO, MENGSHU LIU, TOBY PERRING, CHRIS FROST, JIANGPING HU, MIKE NORMAN, PENGCHENG DAI — We use inelastic neutron scattering to demonstrate the presence of a large spin anisotropy above  $T_N$  in the unstressed tetragonal phase of BaFe<sub>2</sub>As<sub>2</sub>. In the low-temperature orthorhombic phase, we find highly anisotropic spin waves with a large damping along the AF  $a$ -axis direction. On warming the system to the paramagnetic tetragonal phase, the low-energy spin waves evolve into quasi-elastic excitations, while the anisotropic spin excitations near the zone boundary persist. These results strongly suggest that the spin nematicity we find in the tetragonal phase of BaFe<sub>2</sub>As<sub>2</sub> is the source of the electronic and orbital anisotropy observed above  $T_N$  by other probes, and has profound consequences for the physics of these materials.

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