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Toward Understanding the Giant Frictional Anisotropy on AlNiCo KEITH MCLAUGHLIN, HEATHER HARPER, DAVID RABSON, University of South Florida — In a 2005 article in Science [**309**, 1354], Park et al. measured in vacuum the friction between a coated atomic-force-microscope tip and the clean two-fold surface of an AlNiCo quasicrystal. Because the two-fold surface is periodic in one direction and aperiodic (with a quasiperiodicity related to the Fibonacci sequence) in the perpendicular direction, frictional anisotropy is not unexpected; however, the magnitude of that anisotropy in the Park experiment, a factor of 8, is unprecedented. By eliminating chemistry as a variable, the experiment also demonstrated that the low friction of quasicrystals must be tied in some way to their quasiperiodicity. Through molecular-dynamics simulations with pair potentials on quasiperiodic approximants, we investigate generic geometric mechanisms that might give rise to this anisotropy.

Keith McLaughlin
University of South Florida

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