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Temperature dependence of anisotropic magnetoresistance fluctuations and observations of atomic motion in ferromagnetic metal break junctions SUFEI SHI, KIRILL BOLOTIN, FERDINAND KUEMMETH, D.C. RALPH, Cornell University — Recent studies of the resistance of nanometer-scale magnetic junctions as a function of the angle of an applied magnetic field have found very large anisotropic magnetoresistance (AMR) signals, compared to bulk samples. One proposed mechanism is that coupling between the ferromagnetic moment and electron orbits may lead to conductance fluctuations due to quantum interference when the moment is rotated. Here we report that the large AMR signals are suppressed with increasing temperature (T), consistent with a quantum-interference mechanism. We also note that as T is increased to 32 K, most of our samples exhibit an increasing amount of time-dependent two-level resistance noise due to atomic rearrangements. We conclude that higher-T measurements of magnetic nanocontacts generally involve averages over many atomic configurations. In some samples, the atomic switching rates depend strongly on the magnetic field angle, so that even at low T the resistance can sometimes switch abruptly between repeatable values as the field angle is rotated.

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