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Measurement of the Casimir force between ferromagnetic surfaces UMAR MOHIDEEN, ALEXANDR BANISHEV, Department of Physics and Astronomy, University of California, Riverside, USA, GALINA KLIMCHITSKAYA, VLADIMIR MOSTEPANENKO, Central Astronomical Observatory at Pulkovo of the Russian Academy of Science, St. Petersburg, Russia — We have measured the Casimir interaction between two ferromagnetic boundary surfaces using the dynamic atomic force microscope in the frequency shift technique. The experimental data are found to be in excellent agreement with the predictions of the Lifshitz theory for magnetic boundary surfaces combined with the plasma model approach for the free electrons in the metal. In an important difference from non-magnetic metals, the Drude description of the free electrons leads to a Casimir force that is less than that from the plasma model approach. Thus the role of hypothetical patch potentials will be opposite to that required for reconciliation of the data with the Drude model.

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