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Magnetic droplets in nearly ferromagnetic metals close to the quantum critical point YEN LEE LOH, VIKRAM TRIPATHI, Cambridge University, MISHA TURLAKOV, Oxford University — Metallic palladium and platinum have anomalously high magnetic susceptibilities because of their proximity to quantum phase transitions, so that giant magnetic moments may form around impurities such as iron atoms, resulting in a magnetic susceptibility which varies sensitively with temperature, but sometimes shows deviations from the Curie law due to quantum fluctuations. We have studied the case of a magnetic droplet with XY anisotropy using perturbation theory and path-integral Monte Carlo simulation. We find that the susceptibility obeys a logarithmic law close to the quantum critical point that is distinct from the logarithms in the Kondo and Larkin-Mel'nikov theories. Our work provides a fuller understanding of the 'phase diagram' of magnetic droplet systems and has implications for the design of magnetic thermometers based on giant-moment alloys.

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