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**Theory of spin noise spectroscopy of itinerant fermions** SIMON KOS, University of Cambridge, ALEXANDER BALATSKY, Los Alamos National Laboratory, SCOTT CROOKER, Los Alamos National Laboratory, PETER LITTLEWOOD, University of Cambridge, DWIGHT RICKEL, Los Alamos National Laboratory, DARRYL SMITH, Los Alamos National Laboratory — We study the noise of spin magnetization in a region within a system of fermions in different regimes of temperature (degenerate/non-degenerate) and disorder (ballistic/diffusive), with and without spin-flip processes included, and with no particle-particle interactions. We obtain a single spectral line, analyze the dependence of its width and spectral weight on the parameters of the system and the size of the region of interest, and discuss conditions for the maximal effect. We compare our results to the recent measurements of spin noise of alkali-gas vapor and of conduction electrons in a GaAs epilayer.

Simon Kos
University of Cambridge

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