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Generalized Onsager cavity field method for magnets with local spin fluctuations JAMES GLASBRENNER, ALEKSANDER WYSOCKI, KIRILL BELASHCHENKO, University of Nebraska - Lincoln — The Onsager cavity field method is extended to magnets described by a classical spin fluctuation model which interpolates between the limits of localized and itinerant magnetism and captures the qualitative features of itinerant thermodynamics. We find that *both* the interatomic exchange coupling and the on-site interaction are renormalized by short-range order. In the localized (Heisenberg) limit Onsager's approximation is recovered, but in itinerant systems it is essential to include both corrections, for in this case a simple subtraction of only the Onsager reaction field leads to poor results. The generalized Onsager method is compared with the results obtained through mean-field and Monte Carlo methods. It is found that for close-packed lattices with nearest-neighbor exchange there is excellent agreement between the generalized Onsager method and Monte Carlo for any degree of itinerancy, and offers a significant improvement over the mean-field approximation in predicting the Curie temperature [1]. [1]A. L. Wysocki, J. K. Glasbrenner, and K. D. Belashchenko, Phys. Rev. B **78**, 184419 (2008)

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