

Abstract Submitted
for the APR07 Meeting of
The American Physical Society

The equation of state for spin-polarized cold nuclear matter¹

FRANCESCA SAMMARRUCA, University of Idaho, PLAMEN KRASDEV, Texas A&M University, Commerce — We proceed with our broad study of strongly asymmetric states of dense matter, where “asymmetric” may refer to spin and/or isospin asymmetries. In this paper we show and discuss recent results for the equation of state of spin-polarized *nuclear* matter. Comparison with the corresponding calculations we have recently performed for polarized *neutron* matter can give useful insight on how the presence of protons impacts the magnetic susceptibility or the closely related Landau parameter and, in turn, their potential instability with respect to spin oscillations. At this time, conclusions regarding the presence of such instability are very model dependent. For instance, characteristic differences are seen between the predictions of relativistic and non-relativistic calculations. Our approach being microscopic, we can perform an in-depth analysis of the physical origin of such differences and understand them in terms of specific features of the nuclear force in the medium.

¹Supported in part by the U.S. Department of Energy.

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Date submitted: 12 Jan 2007

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