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Neutrino mean free path in asymmetric nuclear matter

The understanding of neutrino interactions with dense nuclear matter is critical to the description of a number of astrophysical processes.
The main ingredient need to calculate the neutrino mean free path (NMFP) is the nuclear response function of the infinite medium.
For this reason we have investigated in a recent series of articles [1,4] the nuclear response function obtained with the Skyrme effective interaction (including tensor components) in asymmetric nuclear matter at finite temperature.
We have performed a systematic study using different Skyrme interaction that satisfy some basic astrophysical constraints [5] and we have analyzed the systematics of the NMFP.
We have also calculated the response function in the Landau limit thus allowing a comparison of the NMFP with calculations done using realistic interactions as Argonne V18 or Chiral effective field theory [6]

[1] A. Pastore,D. Davesne, Y. Lallouet,M. Martini, K. Bennaceur, and J. Meyer, Phys. Rev .C 85, 054317 (2012)
[2]A. Pastore,M. Martini, V. Buridon, D. Davesne, K. Bennaceur,and J. Meyer, Phys. Rev .C 86, 044308 (2012)
[3] A. Pastore, M. Martini, D. Davesne, J. Navarro, S. Goriely, N. Chamel, and M. Pearson (in preparation)
[4] A. Pastore, D. Davesne and J. Navarro (submitted to Phys. Rev C)
[5] M. Dutra, O. Lourenç J. S. S Martins, A. Delfino, J. R. Stone, J. R. Stone, Phys. Rev. C 85, 035201 (2012)
[6] A. Pastore, D. Davesne and J. Navarro (submitted to Journal of Phys. J)

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