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## Interactions of $\eta$ -meson in asymmetric nuclear matter

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The interactions between  $\eta$ -meson and nucleons are studied by the unification of chiral SU(3) model and chiral perturbation theory. The  $\eta$  and nucleon interactions for the next to leading order terms are derived by expanding the  $\eta N$  interaction Lagrangian term within the chiral perturbation theory. Using the chiral SU(3) model, we calculate the in-medium scalar density,  $\rho_s$  for different values of temperature,  $T$ , isospin asymmetry,  $I$ , and nucleonic density,  $\rho_N$ . Further, by clubbing the  $\eta N$  equation of motion with the scalar density, the in-medium mass and optical potential of  $\eta$  meson is derived. The asymmetric matter affects are introduced through the scalar-isovector field  $\delta$  and the vector-isovector field  $\rho$ . We find attractive mass-shift of the  $\eta$  meson which becomes more attractive with the increase in density. The negative mass-shift indicates the possibility of the formation of  $\eta$ -mesic nuclei.

**Primary author(s)** : KUMAR, Rajesh (National Institute of Technology Jalandhar India); KUMAR, Arvind (Dr B R Ambedkar National Institute of Technology Jalandhar India)

**Presenter(s)** : KUMAR, Arvind (Dr B R Ambedkar National Institute of Technology Jalandhar India)

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