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Density Dependent Behaviour Exploration of Hyperon-Nucleon Interaction

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The field of strangeness physics is still post seven decades from its birth holds the exclusive characteristic of having more conjectures than answers in both theoretical and experimental dimensions. One of the major among the open question is the knowledge about background effect on various hyperon-baryon channels playing crucial role from heavy-ion collisions to celestial objects to name a few. To bridge the gap between observed phenomenon and theoretical understanding, the present study focuses on exploring the changes in the hyperon-baryon interaction at various nuclear densities that can eventually act crucial role in predicting unknown possibilities of the field. This approach starts by building a vacuum hyperon-nucleon interaction model based on Boson -Exchange specifically maintaining SU(3) flavor symmetry and taking special care of the channel mixing. Bethe-Goldstone equation is then explored to investigate the medium properties over the bare interaction. A detailed investigation of the density dependence revealed clear changes in the low energy parameters with the variation of the medium shown for higher Strangeness channels. As an interesting input to hyper-matter studies, induced effective three- and many-body interaction effects are explored from density variation of K-matrix terms and low energy parameters.

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