# Tensor force and nuclear mean field

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We would like to present effects of the tensor force in nuclear mean field properties. The existing mean field models have been extremely successful, largely owing to the contributions from David Brink. The Skyrme interaction model, introduced by Brink and Vautherin, gives us basic understanding of nuclear mass, size and single-particle properties within the single model, also due to further developments by other people. On the other hand, there is a missing point: tensor force. Although Skyrme mentioned the tensor force in his original papers, it was not included in the first model probably for simplicity, and has remained missing afterward. The situation was similar in another successful model, Gogny interaction. Gogny also knew the possible importance of the tensor force, but it is missing in the Gogny interaction used widely at present.
We have developed a new mean field model based on the Gogny interaction. The tensor force is included, while we have kept other central, LS and density-dependent terms with re-tuned parameters. The results can reproduce all the nice achievements of Gogny mean field calculations with the D1S interaction by Berger et al. In addition, we can explain what the existing Gogny interaction does not. For instance, single-particle properties around Sn isotopes show anomalous changes of the splitting of proton h11/2-g7/2 levels (observed by Schiffer et al.). Our calculation nicely reproduces this feature, whereas the others have not. We will show how such a new mean field model works in stable and exotic nuclei.