

## **TALENT Course 5: Theory for exploring nuclear structure experiments**

### **Outline project proposal**

**Project name:** Di-neutron correlation in neutron-rich nuclei

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#### **Project outline and aims:**

Many nuclei close to neutron drip line may never be reproduced in experiments, still in nuclear astrophysics there is a need of knowing the physical observables of neutron-rich nuclei. The extreme extrapolation of different models will cause significant difference in the obtained results. The current investigation aims at the assessment of different pairing interactions in the particle-particle channel of Hartree-Fock-Bogoliubov with Skyrme interaction SLy4. We will investigate the neutron pairing correlation near the drip line from the view point of the di-neutron correlation.

#### **Methodology:**

Skyrme-Hartree-Fock-Bogoliubov calculations in coordinate representation with spherical symmetry will be performed for the semi-magic even-even nuclei of nickel  $^{80}\text{Ni}$ ,  $^{82}\text{Ni}$ ,  $^{88}\text{Ni}$  and oxygen  $^{22}\text{O}$  and  $^{26}\text{O}$ . The spin-singlet of two-neutron wave functions, which are based on the results of canonical wave functions from Hartree-Fock-Bogoliubov, will be presented. It is expected that the density-dependent pairing interaction gives rise to a di-neutron correlation which is stronger than a density-independent pairing interaction.