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Probing pairing effects @LNL-SPES

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The subject of this LoI is two-fold: first to investigate neutron-neutron pairing effects in the neutron-rich Sn isotopes and second, to investigate the mixed neutron-proton pairing in the heavy nuclei.

Firstly, neutron-proton mixing pairing is predicted to occur in heavy nuclei close to the $N=Z$ line but with an isospin imbalance and within the proton drip-line. Possible experimental observables are the measurement of the pairing gap or the observation of low-lying excitations. We propose to investigate the low-lying spectrum of nuclei lying around ^{130}Eu through the fusion-evaporation reaction ^{78}Kr on ^{58}Ni using AGATA-NEDA-SPIDER or DIAMANT set-up.

Secondly, in nuclear structure studies the pairing interaction plays a fundamental role in defining the low-energy spectra of nuclei and the properties of their ground state. Of key relevance for the study of this pair correlation is the determination of the matrix elements connecting pair addition and pair removal. The pairing interaction is in fact expected to be significantly modified in nuclei with extended neutron distributions where the neutron Fermi surface is close to the continuum with a significant increase of the strength towards the low-lying 0^+ . We propose to investigate the two-neutron transfer cross section (t,p) to the gs and to low-lying 0^+ states in even-even neutron-rich Sn isotopes with GRIT-AGATA set-up.

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