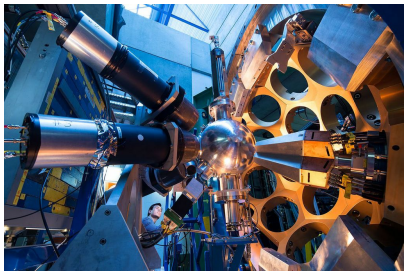

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# Search for a nuclear Josephson effect in 60Ni+116Sn sub-barrier transfer reactions with the PRISMA+AGATA set-up

*mardi 16 septembre 2025 15:00 (20 minutes)*

Sub-barrier transfer experiments have been recently carried out at LNL in the 60Ni+116Sn system, where the two neutron transfer channel is well Q-value matched. Reaction products have been detected in inverse kinematic and at forward angles with the large solid angle magnetic spectrometer PRISMA, providing high efficiency and resolution. In these studies one follows the behavior of the transfer probabilities by varying the internuclear distance, a method which turned out to be fundamental to probe nucleon-nucleon correlation effects. Indeed most of the cross section of the two neutron transfer channel has been shown to be in the ground-to-ground state transition, indicating the possibility to study into detail the effect of pair transfers.
Very recently, the coupling of the AGATA gamma array to PRISMA offered a unique opportunity to study a nuclear (alternating current, AC) Josephson-like effect, with Cooper-pair tunneling between superfluid nuclei, whose manifestation has been recently proposed using the 60Ni+116Sn data as a stepping stone. Predictions have been made of a specific gamma strength function associated with the dipole oscillations generated by the, mainly successive, two neutron transfer process. We directly tested for the first time the possible manifestation of this important effect of Cooper pair behavior, observed to date only in condensed matter physics.
This talk focuses on the ongoing analysis of these new results, accompanied by simulations that include the presence of the predicted gamma-ray distribution.

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