

## Probing nucleon-nucleon correlations in heavy ion transfer reactions

*Thursday 14 July 2022 09:03 (20 minutes)*

The pairing interaction induces particle-particle correlations that are essential in defining the properties of finite quantum many body systems in their ground and neighbouring states. The two-nucleon transfer reactions turned to be a very specific probe of this pairing.

The experimental transfer probabilities for one- and two-neutron transfer channels as a function of the distance of closest approach have been extracted for the closed shell  $40\text{Ca}+96\text{Zr}$ , superfluid  $60\text{Ni}+116\text{Sn}$  and heavy  $118\text{Sn}+206\text{Pb}$  systems, from the Coulomb barrier energy to energies corresponding to large distances of closest approach. For the superfluid  $60\text{Ni}+116\text{Sn}$  system, the experimental two-neutron transfer probabilities were reproduced by incorporating neutron-neutron correlations (D. Montanari et al., Phys. Rev. Lett. 113 (2014) 052501).

Very recently, this study has been characterized as the nuclear analogue to the (alternating-current) Josephson effect (G. Potel, F. Barranco, E. Viguzzi, and R. A. Broglia, Phys. Rev. C 103 (2020) L021601).

The talk will focus on the main outcome of these recent studies, critically addressing the new achievements, the present problems and new challenges.

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