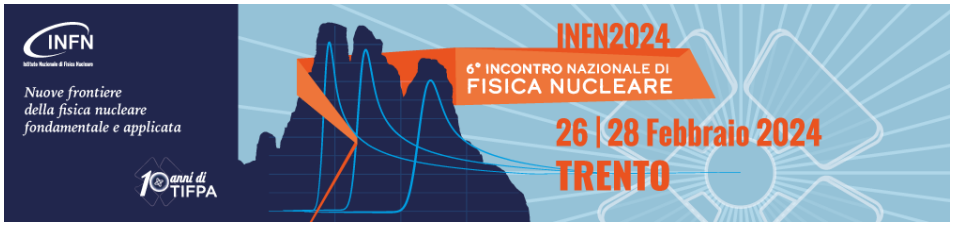

Contribution ID: **147** Type: **Oral**

Nuclear response and decay processes within beyond mean-field methods (Invited)

Monday, 26 February 2024 15:30 (30 minutes)

The nuclear response and decay processes, besides being intrinsic key-features of atomic nuclei, are intimately related to fundamental open questions such as the nuclear equation of state and in-medium nucleon-nucleon interaction, nucleosynthesis and properties of astrophysical objects, fundamental symmetries and physics beyond the Standard Model. From a theoretical point of view, the nuclear response is typically described within the linear-response theory through the so-called Random Phase Approximation (RPA), relying on a mean-field description of the nucleus. This approximated description provides the general features of the nuclear response, such as the total strength and centroid distributions. However, a more refined description is required in many respects, which involves incorporating many-body correlations beyond the mean-field approximation. In the last decade, advanced beyond-mean-field methods have been developed and numerically implemented, showing their power and efficiency. In particular, the particle-vibration coupling model [1, 2, 3] and the second RPA [4,5] are able to describe properties and features that cannot be achieved within the standard RPA. In this talk, recent applications of these methods will be discussed, particularly those focused on the giant monopole resonance and nuclear incompressibility [6, 7], and on Gamow-Teller excitations and beta-decay [8–10].

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Session Classification: Nuclear Structure and Reactions I