

## What we can learn from nucleon-nucleon correlations?

S. M. Wang<sup>1,2</sup>

<sup>1</sup>*Key Laboratory of Nuclear Physics and Ion-beam Application (MOE),  
Institute of Modern Physics, Fudan University, Shanghai 200433, China and*

<sup>2</sup>*Shanghai Research Center for Theoretical Nuclear Physics,  
NSFC and Fudan University, Shanghai 200438, China*

Exotic decay occurs beyond the dripline of the nuclear landscape. Among these decays, the two-proton ( $2p$ ) radioactivity is a unique three-body process that involves the emission of two protons from the ground state of even- $Z$  neutron-deficient nuclei. Interest in this exotic phenomenon has been invigorated by measurements of proton-proton correlations, which provides invaluable information on the interplay between structure and reaction aspects of the nuclear open quantum system. In this presentation, we employ the Gamow coupled-channel method and a time-dependent approach [1] to demonstrate that the structure of the initial wave function, governed by the initial-state and final-state interactions can impact the decay dynamics and leave an imprint on asymptotic correlations [2]. Furthermore, the energy dependence of the asymptotic nucleon-nucleon correlations offers a distinct opportunity for the study of non-exponential decay, which can provide insights into the properties of open quantum systems.

[1] S. M. Wang and W. Nazarewicz, *Phys. Rev. Lett.* **126** (2021) 142501.

[2] S. M. Wang, W. Nazarewicz, R. J. Charity, and L. G. Sobotka, *J. Phys. G* **49**, (2022) 10LT02.