Contribution ID: **43** Type: **Oral Contribution**

# Dineutron correlations in knockout reactions with Borromean halo nuclei

*Tuesday 25 October 2022 15:35 (20 minutes)*

A key element to explain the binding of loosely bound Borromean halo nuclei is the correlation between the halo neutrons [1,2]. The characterization of the dineutron correlation, understood as a spatially localized $n$-$n$ pair, is therefore an important step in the description of the neutron dripline. Various experimental techniques have been used in recent years to probe these correlations, including Coulomb dissociation, neutron knockout and quasifree neutron removal [3-5]. Theoretically, the localization of the pair at the low-density surface of neutron-rich nuclei has been suggested to appear as a universal feature for these systems [6,7], and can be linked to the admixture of different-parity states [8].

I will present recent results for various two-neutron halo nuclei explored via $(p, pn)$ neutron knockout. We will study the $n$-$n$ correlations focusing on the opening angle as a function of the intrinsic neutron momentum. Our approach is based on a core $+ n + n$ three-body model for the structure and a quasifree sudden model for the reaction [9]. For $^{11}$Li, $^{14}$Be and $^{17}$B, calculations will be compared to recent RIKEN data [5,10], supporting the aforementioned universality. The sensitivity to small opposite-parity admixtures and to absorption effects, as well as the role played by the core in the observation of such correlations, will be discussed. These results pave the path for future studies on $n$-$n$ correlations in heavier dripline nuclei.

[1] M. V. Zhukov et al., Phys. Rep. 231, 151 (1993).
[2] K. Hagino and H. Sagawa, Phys. Rev. C 72, 044321 (2005).
[3] Nakamura et al., Phys. Rev. Lett. 96, 252502 (2006).
[4] H. Simon et al., Phys. Rev. Lett. 83, 496 (1999).
[5] Y. Kubota et al., Phys. Rev. Lett. 125, 252501 (2020).
[6] M. Matsuo, Phys. Rev. C 73, 044309 (2006).
[7] K. Hagino, H. Sagawa, J. Carbonell and P. Schuck, Phys. Rev. Lett. 99, 022506 (2007).
[8] F. Catara, A. Insolia, E. Maglione and A. Vitturi, Phys. Rev. C 29, 1091 (1984)
[9] J. Casal and M. Gómez-Ramos, Phys. Rev. C 104, 024618 (2021).
[10] A. Corsi et al., submitted.

**Primary author:** CASAL, Jesús (University of Seville)

**Presenter:** CASAL, Jesús (University of Seville)

**Session Classification:** P9 Few-Body Systems

**Track Classification:** P9 Few-Body Systems