



Contribution ID: 211

Type: **Oral Presentation**

## Four Neutron Point-Production within pionless EFT

*Monday 22 September 2025 15:55 (20 minutes)*

Recent experiments [Duer et al., Nature 606 (2022)] suggest a resonance-like structure in the  ${}^8\text{He}(p,p\alpha)4n$  reaction. To investigate this, we analyze four-neutron point-creation using pionless effective field theory (EFT) within the Faddeev-Yakubovsky formalism, which enables a decomposition into the 2+2 and 3+1 channel. This is particularly relevant given that dineutron-dineutron correlations (2+2 channel) may drive the observed structure [Lazauskas et al., PRL 130 (2023)].

Within this framework, we present results for the four-neutron point-creation rate, proportional to the cross section. These results are checked to be consistent, at both low and high energies, with conformal field theory (CFT), which treats the multi-neutron state as an ‘unnucleus’ [Hammer et Son, PNAS 118.35 (2021)]. This analysis aims to provide insight into the possible existence of a tetra-neutron resonance-like structure.

**Author:** BACKERT, Timothy George (Technische Universität Darmstadt)

**Co-authors:** Prof. HAMMER, Hans-Werner (Technische Universität Darmstadt); Prof. KÖNIG, Sebastian (North Carolina State University)

**Presenter:** BACKERT, Timothy George (Technische Universität Darmstadt)

**Session Classification:** Few-Body Systems

**Track Classification:** Few-Body Systems