



Contribution ID: 90

Type: **Oral**

## The X17 boson anomaly: overview and forthcoming experiments (Invited)

Wednesday, 28 February 2024 09:00 (25 minutes)

Three significant anomalies have been observed in the emission of electron-positron pairs in the  ${}^7\text{Li}(p, e^+e^-){}^8\text{Be}$ ,  ${}^3\text{H}(p, e^+e^-){}^4\text{He}$  and  ${}^{11}\text{B}(p, e^+e^-){}^{12}\text{C}$  nuclear reactions [1–3] that have been interpreted as the signature of a boson (referred to as X17) of mass  $M_{X17} \simeq 17 \text{ MeV}/c^2$  that could be the mediator of a fifth force, characterised by a strong suppression of the coupling to protons compared to neutrons (protophobic force) [4]. Beyond the importance of such a discovery –if confirmed– this scenario could explain, at least partially, the long-standing (recent) anomaly on the muon (electron) magnetic moment [5]. More in general, the possible existence of this particle would be of paramount importance in particle physics and in cosmology (dark matter). For this reason, it has spurred various experiments addressed to verify the X17 boson claim and eventually to shed light on its properties. In this talk the present X17 boson scenario is summarised and new dedicated proposals are discussed.

- [1] A. J. Krasznahorkay et al., Phys. Rev. Lett. 116, (2016) 042501.
- [2] A. J. Krasznahorkay et al., Phys. Rev. C 104, (2021) 044003.
- [3] A. J. Krasznahorkay et al., Phys. Rev. C 106, (2022) 061601.
- [4] J. L. Feng, B. Fornal, I. Galon, S. Gardner, J. Smolinsky, T. M. P. Tait and P. Tanedo Phys. Rev. Lett. 117, (2016) 071803.
- [5] L. Morel, Z. Yao, P. Cladé, S. Guellati-Khélifa, Nature 588, (2020) 61.

**Primary author:** GUSTAVINO, Carlo (Istituto Nazionale di Fisica Nucleare)

**Presenter:** GUSTAVINO, Carlo (Istituto Nazionale di Fisica Nucleare)

**Session Classification:** Symmetries and Fundamental Interactions