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A new light particle is being born

Thursday, 26 May 2022 09:30 (30 minutes)

A few years ago we observed anomalous electron-positron angular correlations for the 18.15~MeV M1 transition of 8Be [1]. This was interpreted as the creation and decay of an intermediate bosonic particle with a mass of m0c2=16.70(35)(stat)(50)(sys) MeV, which is now called X17. The possible relation of the X17 boson to the dark matter problem triggered an enormous interest in the wider physics community. We then re-investigated the 8Be anomaly with an improved, and independent setup, and confirmed the signal of the assumed X17 particle [2,3].
We also observed a similar anomaly in 4He [4], which could be described also by the creation and subsequent decay of the same X17 particle. Our results agree well with the present ab initio calculations of Viviani et al., [5].
Very recently, the 11B proton capture reaction was used for exciting the 17.2 MeV broad (Gamma= 1.15 MeV) resonance in 12C and studying their internal pair creation decay. Significant anomalies were observed in the angular correlation of the electron-positron pairs, at three different bombarding energies, which provides kinematic evidence for the X17 particle and supports their vector boson and fifth force explanation.

[1] A.J. Krasznahorkay et al., Phys. Rev. Lett. 116 (2016) 042501.
[2] A.J. Krasznahorkay et al., J. Phys.: Conf. Series 1056 (2018) 012028.
[3] A.J. Krasznahorkay et al., Acta Phys. Pol. B 50 (2019) 675.
[4] A.J. Krasznahorkay et al., Phys. Rev. C 104 (2021) 044003.
[5] M. Viviani et al., Phys. Rev. C 105, (2022) 014001.

Attendance

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