

Radiative Capture and Pair Production in $p+{}^7\text{Li}$

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We examine the nuclear reactions ${}^7\text{Li}(p,\gamma){}^8\text{Be}$ and ${}^7\text{Li}(p,e+e-){}^8\text{Be}$ from an ab initio perspective.

Using the no-core shell model with continuum technique, with chiral nucleon-nucleon and three-nucleon forces as input, we obtain an accurate description of both ${}^8\text{Be}$ bound states and $p+{}^7\text{Li}$ scattering states.

We calculate radiative capture reactions in which enough energy is released to produce electron-positron pairs. The distribution of pairs can be compared to recent ATOMKI experiments where an anomaly in the data was used to posit the existence of a new particle.

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