

Investigating Halos with Pion Photoproduction

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Abstract

A recent calculation[1] of the reaction ${}^6\text{Li}(\gamma, \pi^+){}^6\text{He}$, using the Distorted Wave Impulse Approximation (DWIA) model of Tiator and Wright[2] suggests that ${}^6\text{He}$ does not display a halo structure. Halo and non-halo wavefunctions for the ${}^6\text{He}$ ground state were modelled using Woods-Saxon and harmonic oscillator wavefunctions respectively. It was found that the non-halo results were favoured by the limited data available on this reaction, although the discrimination was based on only one data point. This is, of course contrary a large body of theoretical and experimental work that is consistent with separation energies and r.m.s. radii more suited to ${}^6\text{He}$ having an extended halo structure. With a new experiment[3] planned for MAINZ later this year, we are re-examining this model with the intention of using fully correlated 3-body wavefunctions for ${}^6\text{He}$ which account more realistically for its Borromean structure and which have proved successful in other applications. This An introduction to the model and preliminary results will be given.

References

- [1] S.Karataglidis *et al.*, Phys. Rev. C **61** 024319 (2000)
 - [2] L.Tiator and L.E. Wright, Phys. Rev. C **30** 989 (1984)
 - [3] D. Branford *et al.*, Proposal, Mainz/Bonn (unpublished)
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