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Quasifree alpha cluster knockout studies

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Cluster-like structures in the shell-model description of the ground state of nuclei can be conveniently studied by means of knockout reactions. Of these the (p, p alpha) reaction is perhaps the simplest, especially from the viewpoint of the tractability of theoretical calculations used to interpret experimental results. The distorted wave impulse approximation (DWIA) is a versatile theory which is applicable to a knockout reaction. Fortunately its results appear to be reasonably insensitive to uncertainties in the exact ingredients, such as distorting optical potentials, which are obtained from unrelated elastic scattering studies. It will be shown that a number of surprisingly simple approximations in the DWIA hold for alpha-cluster knockout from light nuclei. Furthermore, results for a medium-mass nuclear target such as ^{40}Ca are also consistent with expectation. Extracted spectroscopic factors are in reasonable agreement with shell-model estimates.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

No

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

Yes

Primary author: Prof. COWLEY, Anthony (Stellenbosch University)

Presenter: Prof. COWLEY, Anthony (Stellenbosch University)

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