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Analysis of isospin dependence of "quenching factors" for (p,pn) and (p,2p) reactions via the Transfer to the Continuum formalism

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Nucleon removal (p,pn) and (p,2p) reactions at intermediate energies have gained renewed attention in recent years as a tool to extract information from exotic nuclei, thanks to the availability of exotic beams with which to perform these reactions in inverse kinematics. The information obtained from these experiments is complementary to that obtained from nucleon removal experiments with heavier targets (knockout), but is expected to be sensitive to deeper portions of the wave function of the removed nucleon.

Recently, two sets of (p,pn) and (p,2p) data on oxygen and nitrogen isotopes have been obtained by the R3B collaboration [1,2] and have been analysed in terms of the eikonal DWIA [1] and Faddeev/AGS [2] formalisms. Both analyses obtain a reduction in the spectroscopic strength but predict a different magnitude for this reduction and different isospin dependence. Also, it must be noted that the analysis of [1] was restricted to five selected oxygen isotopes, which were deemed to be more suitably described by the Independent Particle Model (IPM).

In this contribution we present a joint analysis of both sets of data, including all measured isotopes, using a common reaction framework, the recently developed Transfer to the Continuum [3] formalism, with consistent potentials and structure inputs. Our analysis shows an almost constant reduction factor with a very small, nearly absent, isospin dependence. This result is in accord with recent transfer experiments [4], but at odds with the marked asymmetry obtained from the systematic analysis of nucleon knockout reactions at intermediate energies [5]. The effect of the distorting potentials on these results is explored by using two different sets of potentials. It is found that the small asymmetry is maintained with both sets even if the reduction factors for the specific reactions may be significantly different.

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Primary authors: Dr MORO, Antonio M. (Universidad de Sevilla); Mr GÓMEZ RAMOS, Mario (Universidad de Sevilla)

Presenter: Mr GÓMEZ RAMOS, Mario (Universidad de Sevilla)

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