Differential isomeric ratios following two-proton knockout from ^{208}Pb

E. C. Simpson*
University of Surrey

We consider direct two-nucleon knockout reactions using light nuclear targets as a means of populating isomeric states in exotic nuclei, taking the example of two-proton removal from ^{208}Pb. Two isomeric states in ^{206}Hg are observed [1], the isomeric population ratios of which are reasonably described by two-proton knockout calculations once the observed feeding is taken into account [2].

Recent theoretical developments indicate that residue momentum distributions depend strongly on the final-state spin [3], such that the population ratio of high-spin states increases for large residue momentum. This tendency was observed in isomer studies using fragmentation reactions, which show a strong sensitivity of the isomeric ratio to the residue momentum [4,5].

The previous theoretical analysis for ^{208}Pb(-2p) is extended to consider isomeric ratios as a function of residue longitudinal momentum. Despite strong broadening due to the thick reaction target of the present experiment, the isomeric ratio retains significant sensitivity to the residue momentum, well reproduced by the direct two-proton removal calculations. The theoretical underestimation of the isomeric ratio near the residue central momentum suggests a degree of additional, unobserved feeding from low-spin states.

*Supported by the United Kingdom Science and Technologies Facilities Council under Grant No. ST/F012012

[1] Steer *et al.*, Int. J. Mod. Phys. E **18**, 1002 (2008)
[2] Simpson *et al.,* PRC **80**, 064608 (2009)
[3] Simpson et al., PRC **79**, 064621 (2009)
[4] Schmidtt-Ott *et al.,* Z. Phys. A **350**, 215 (1994)
[5] Daugas *et al.,* PRC **63**, 064609 (2001)