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The Effects of Nonlocality in the DOM ALAINA ROSS, L. TITUS, F. NUNES, Michigan State University — Due to the instability of exotic nuclei, nuclear reactions are often utilized to study their structure. Given that the form of the nuclear potential is not yet known, effective interactions and simplifications are often employed, which can introduce large uncertainties in the theoretical models. One such simplification is the inclusion of nonlocality through a correction factor to a local equivalent potential; however, the use of this method has previously been proven inadequate. In this work, the effects of nonlocality in the dispersive optical model are considered in the bound and scattering states as well as in (p,d) transfer cross sections. To accomplish this, we conducted a systematic study of ^{40}Ca at 20, 35 and 50 MeV in which nonlocality was accounted for explicitly in the entrance channel and through the distorted wave Born approximation for transfer. We found that the inclusion of nonlocality in the bound states had a significantly greater effect than that of nonlocality in the scattering states. In addition, nonlocality in both states lead to non-negligible differences in transfer cross sections. These results reiterate the importance of using an exact solution of the nonlocal equation rather than a local equivalent or a corrected local solution.

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