**Novel Indication for Non-Locality of the Optical Model for $^{12}$C**

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— In this work we consider the n - $^{12}$C elastic scattering data and fit the angular distributions in the energy range 12 to 20 MeV. Our fits are obtained by adding to the conventional optical model a new term which is real, velocity dependent and is assumed to represent the nuclear density. The fits reproduce well the detailed structure of the angular distributions including the prominent backscattering minima which depend sensitively on the incident energies. A sign of the presence of non-locality is manifested a) by the pronounced motion of the peak of the spin-orbit potential towards the nuclear interior as the incident energy increases, and b) the necessary presence of a velocity-dependent term, which is nearly stationary as the incident energy increases. All our potentials have the form of the conventional Woods-Saxon potential or its derivative. Possible explanations of the non-locality in terms of physical processes will be attempted. Non-localities in the nucleon - $^{16}$O optical potential were also previously found by Cooper [1] in the form of parity dependent potentials.

[1] S. G. Cooper, Nucl. Phys. A618 (1997), 87-106.

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