

Isospin dependent dispersive coupled channel optical model potential based on soft rotor Hamiltonian for tungsten isotopes

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Abstract

An isospin dependent coupled channel optical model potential (OMP) containing a dispersive term including non-local contribution is used to simultaneously fit the available experimental database (including strength functions and scattering radius) for neutron and proton scattering on transitional tungsten isotopes. The energy range 0.001-200 MeV is covered. A dispersive coupled-channel OMP based on soft rotor Hamiltonian coupling with parameters that show a smooth energy dependence and energy independent geometry are determined from fits to the entire experimental data set. Inclusion of non-locality effects in the absorptive volume potential and its corresponding dispersive contribution to the real potential is needed to achieve excellent agreement above 100 MeV. Calculations using obtained potential reproduce measured total cross section for all isotopes and total cross section differences between tungsten isotopes up to 200 MeV within experimental uncertainty.

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