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Separable coupled-channels momentum space potentials for nuclear reactions[1] LINDA HLOPHE, VASILY EREMENKO, CHARLOTTE ELSTER, Ohio University, FILOMENA NUNES, Michigan State University, ARBANAS DELTUVA, Oak Ridge National Laboratory, JUTTA ESCHER, IAN THOMPSON, Lawrence Livermore National Laboratory, TORUS COLLABORATION — Many nuclei are deformed and their properties may be described using a rotational model. This involves defining a deformed surface of the nucleus and constructing the nuclear interaction as a function of distance to the surface. The resulting potential has non-zero matrix elements between different rotational states which are characterized by the nuclear spin-parity I^π, leading to channel couplings. Our goal is to utilize these coupled-channels potentials in momentum space Faddeev calculations which take into account core excitations. For this purpose their separable representation in momentum space is necessary. We accomplish this by employing the separable representation scheme developed by Ernst, Shakin, and Thaler (EST). Since the potentials are complex, the multichannel EST scheme is generalized to non-Hermitian potentials. In the case of proton-nucleus interactions the EST scheme is further extended to include charged particles. The multichannel EST scheme is applied to scattering off ^{10}Be and ^{12}C . For ^{10}Be only couplings to the first excited state ($I^\pi = 2^+$) were included while for ^{12}C the first two excited states ($I^\pi = 2^+, 4^+$) were taken into account.

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