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**Separabilization of Optical Potentials in Momentum Space**[1]
LINDA HLOPHE, CHARLOTTE ELSTER, Ohio University — Separable representations of optical potentials have important applications in Faddeev calculations for (d,p) reactions [1]. A way to construct separable representations of local potentials was suggested by Ernst, Shakin, and Thaler (EST) [2]. In order to employ the EST scheme, we obtained a semi-analytic Fourier transform of the Woods-Saxon potential as input to the momentum space Lippmann-Schwinger equation. The resulting half-shell t-matrices at given support points are the form factors of the separable expansion. Starting from the Chapel-Hill 89 (CH89) optical potential partial wave S-matrix elements in the range from 0 to 50 MeV are constructed for three closed shell nuclei, $^{48}$Ca, $^{132}$Sn, and $^{208}$Pb. The quality of the separable representation of the S-matrix elements depends on (a) the choice of support points, (b) the partial wave of interest, and (c) the rank of the separable optical potential.

[1] C. Elster and L. Hlophe, Journal of Physics: Conference Series (**403**), 012025 (2012).
[2] D. J. Ernst, C. M. Shakin and R. M. Thaler, Phys. Rev. C **8**, 46 (1973).

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