

Optical model potential (Spin-orbital part)

Optical model potential (OMP) is a complex function depending usually on the distance between colliding nuclei which may include the Spin-orbit component. In the “Nuclear transfer reaction” section of the NRV project the spin-orbital part of the OMP is treated in the following form (Thomas form)

$$V_{SO}(r) = -(\mathbf{L} \cdot \mathbf{s})(V_{SO} + iW_{SO}) \frac{1}{r} \frac{d}{dr} \left[1 + \exp \frac{r - R_{SO}}{a_{SO}} \right]^{-1},$$

where V_{SO} and W_{SO} are the depths of the spin-orbit potential, $R_{SO} = r_{SO}A_T^{1/3}$ is its radius, A_T is the target mass number, and a_{SO} is the diffuseness of the potential. Vectors \mathbf{L} and \mathbf{s} are the orbital and spin momenta correspondingly.