

Interaction nucleus-nucleus potential (imaginary part)

Interaction potential (IPot) is a complex function depending usually on the distance between colliding nuclei. In the “Radiative capture reaction” section of NRV project the imaginary part of the IPot can be treated in the following forms:

1. Woods-Saxon (volume) form:

$$W(r) = \frac{W_0}{1 + \exp\left[\frac{r - R_W}{a_W}\right]},$$

where $W_0 < 0$ is the depth of the potential, $R_W = r_W A_T^{1/3}$ is its radius, A_T is the target mass number, and a_W is the diffuseness of the IPot.

2. Woods-Saxon (surface) form:

$$W(r) = -4a_D W_D \frac{d}{dr} \frac{1}{1 + \exp\left[\frac{r - R_D}{a_D}\right]},$$

where $W_D < 0$ is the depth of the potential, $R_D = r_D A_T^{1/3}$ is its radius, and a_D is the diffuseness of the IPot.

3. Superposition form is a sum of the volume and surface Woods-Saxon potentials.