Semi-classical Microscopic Approach to the Liquid Drop Model

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Semi-classical microscopic Approach to the Liquid Drop Model (SMLDM)

\[ \Phi = \prod_{k=1}^{M} \frac{1}{\sqrt{2\pi\sigma_{k}^{2}(r)}} \exp \left( -\frac{(r_{k} - \langle r_{k} \rangle)^{2}}{4\sigma_{k}^{2}(r)} + \frac{i}{\hbar} \Phi_{k}(P_{k}) \right) \]

\[ S = \int_{t_{1}}^{t_{2}} L (\Phi, \dot{\Phi}) \, dt \]

\[ L = \left\langle \Phi \left| \frac{i}{\hbar} \frac{d}{dt} - H \right| \Phi \right\rangle = \left\langle \Phi \left| i\hbar \frac{d}{dt} \right| \Phi \right\rangle - \left\langle \Phi \left| H \right| \Phi \right\rangle \]

\[ \left\langle \Phi \left| T \right| \Phi \right\rangle = \sum_{k=1}^{N} \left[ \frac{(p_{k})^2}{2m} + \frac{3\sigma_{k}^{2}(p)}{2m} \right] \]

\[ V_{N} = \sum_{\{r_{k}\}, \{\sigma_{k}(r)\}} \]

\[ B_{N} = \sum_{k=1}^{M} \frac{3\sigma_{k}^{2}(p)}{2m} \]
Simulation and construction of Scintillation Ionization Detector (SID)

GARFIELD simulation
Thickness measurements

Figure 11: Experimental setup for measuring the energy loss of Alpha particle in Mylar foil
Target thickness measurements at Ganil
Simulation of Secondary electron Detector (SeD)

FALSTAFF setup

IC, Source or target, Emissive foil, SED

Simulation

Garfield, Comsol

Electric field, Magnetic field

Geant4

TOF 50 cm
Thank you ...