

Variational method with an explicit energy functional for neutron matter at finite temperature taking into account the spin-orbit force

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Extension to finite temperature :
the method by Schmidt-Pandharipande

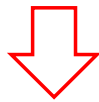
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The free energy

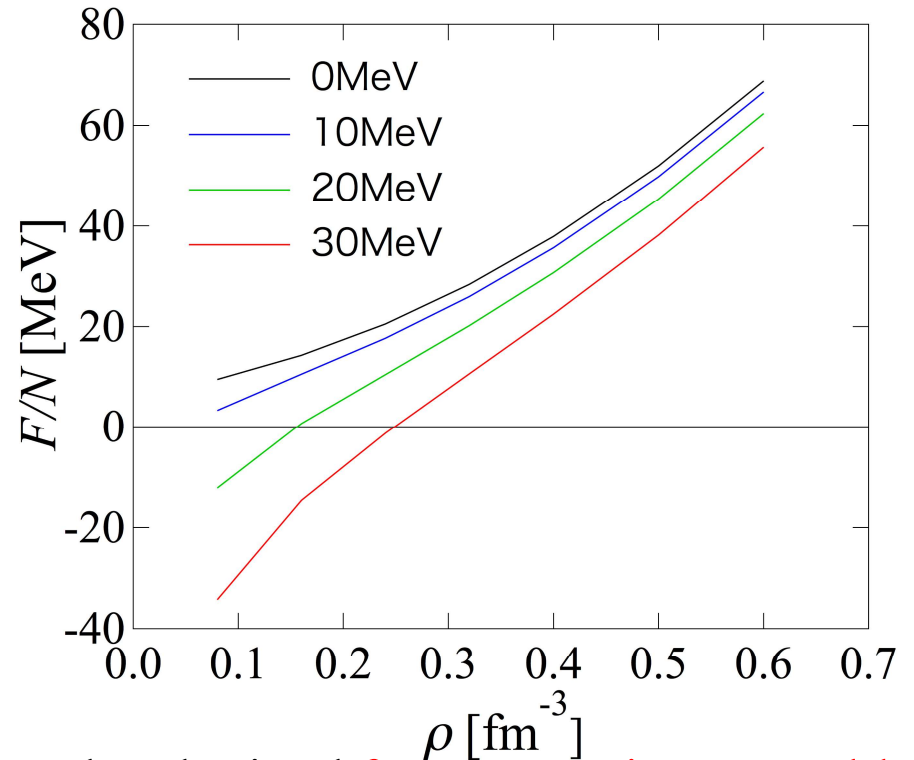
$$\frac{F}{N} = \frac{E_{0T}}{N} - T \frac{S_0}{N}$$

S_0 : The entropy based on the Landau's Fermi liquid theory

E_{0T} : The internal energy extended from zero temperature



The free energy is minimized with respect to
the effective mass and the distribution functions.



The obtained free energy is reasonable.
But the solution violates the uniform
distribution condition.