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*On a relationship between the TFDW and the Liquid Drop models via Gamma convergence*

We consider the TFDW model and the Liquid Drop Model with external potential, a model proposed by Gamow in the context of nuclear structure. It has been observed that the TFDW model and the Liquid Drop Model exhibit many of the same properties, especially in regard to the existence and nonexistence of minimizers. We show that, under a “sharp interface” scaling of the coefficients, the TFDW energy with constrained mass Gamma-converges to the Liquid Drop model, for a general class of external potentials. Finally, we present some consequences for global minimizers of each model