Liquid interfaces in Ising fluids

I. P. Omelyan[1,2], W. Fenz[2], R. Folk[2] and I. M. Mryglod[1,2]
[1] *Institute for Condensed Matter Physics, 1 Svientsitskii Street., UA-79011 Lviv, Ukraine*
[2] *Institute for Theoretical Physics, Linz University, A-4040 Linz, Austria*

We study the thermodynamic properties and microscopic structure of liquid-liquid and liquid-vapor interfaces in Ising spin fluids by an integral equation approach. The coupled set of the Lovett-Mou-Buff-Wertheim equations for the inhomogeneous one-particle distribution functions and the Ornstein-Zernike equations for the bulk two-particle correlation functions complimented by the closure relation are solved using a modified soft mean spherical approximation. The two-particle inhomogeneous direct correlation functions are consistently constructed by nonlinear interpolation of the bulk ones corresponding to the coexisting phases. The density and magnetization profiles at the liquid-liquid and liquid-vapor interfaces are calculated in a wide range of temperatures including subcritical regions. The liquid-liquid adsorption coefficient and the liquid-vapor surface tension are evaluated as well. The influence of the external magnetic field on the structure of the liquid-vapor interfaces is also analyzed.

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[1] I. P. Omelyan, I. M. Mryglod, R. Folk, and W. Fenz, Phys. Rev. E **69**, 061506 (2004).

[2] I. P. Omelyan, R. Folk, I. M. Mryglod, and W. Fenz, J. Chem. Phys. **126**, 124702 (2007).