

Liquid-liquid equilibrium in simple fluids: shoulder and ramp potential models.

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In this work we present an investigation on the presence of a second critical point (corresponding to liquid-liquid equilibrium) in two families of potentials, on one hand the shoulder+square well potentials devised by Skibinsky et al.[1] and the core softened ramp potentials[2]. The analysis is performed using both a constant pressure integral equation and Wang-Landau type simulation methods to map the phase diagram.

[1] A. Skibinsky, S.V. Buldyrev, G. Franzese, G. Malescio, and H.E. Stanley, *Phys. Rev.* **E69**, 061206 (2004).

[2] Nigel B. Wilding and James E. Magee, *Phys. Rev.* **E 66**, 031509 (2002).