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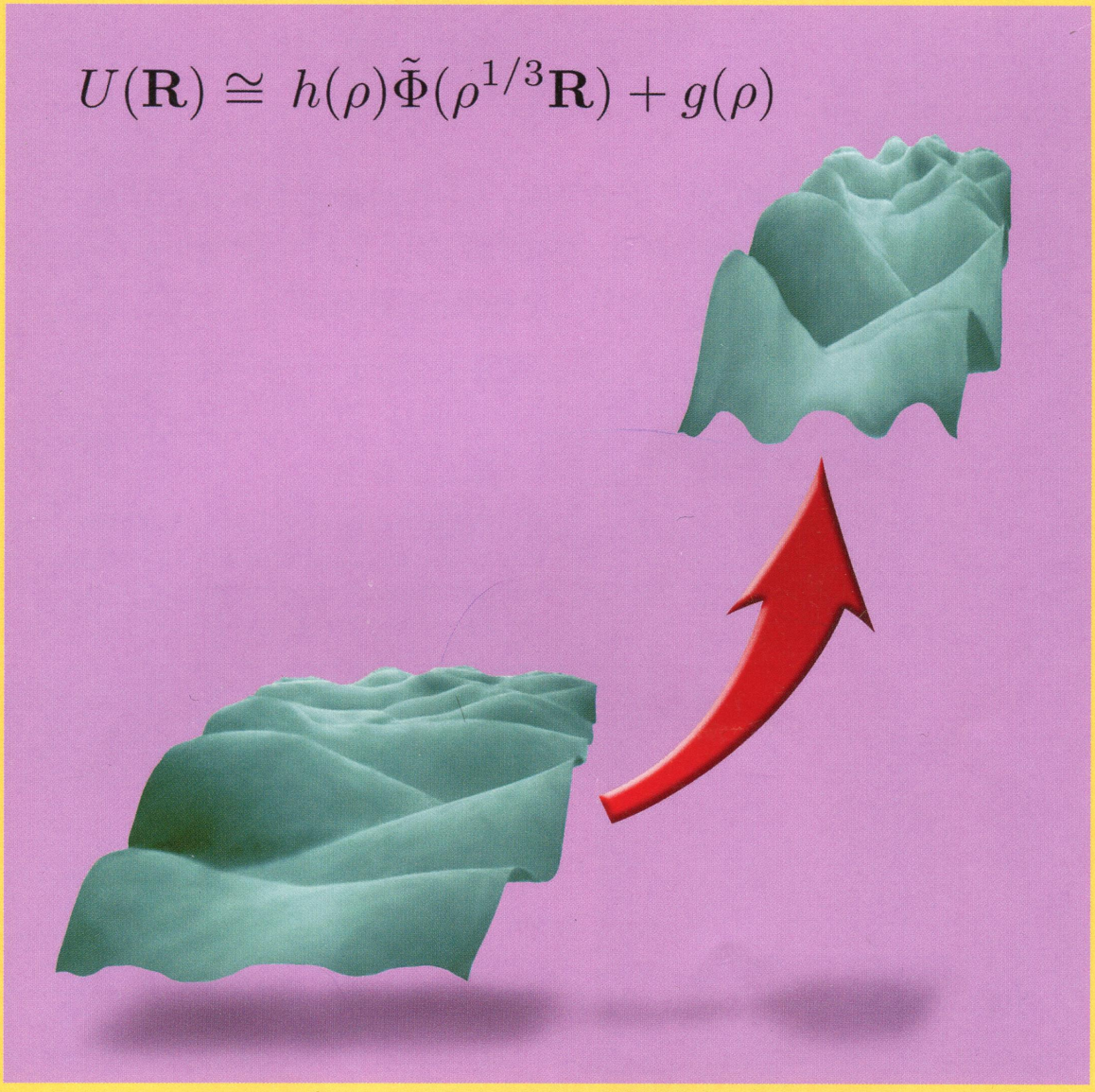

Compression Induces a Linear Affine Scaling of the Potential-Energy Surface
(see page 10007)

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ON THE COVER: For many liquids and solids, compression induces a linear affine overall scaling of the high-dimensional potential-energy surface, a phenomenon referred to as hidden scale invariance. The Feature article reviews recent works that have established this novel picture of the physical chemistry of condensed matter. It applies to a good approximation for van der Waals bonded and metallic systems but not for systems dominated by directional forces like hydrogen bonds or covalent bonds. Systems with hidden scale invariance are characterized by having isomorphs in their thermodynamic phase diagram, which are curves along which structure and dynamics to a good approximation are invariant in reduced units. In effect, the phase diagram becomes one-dimensional for many purposes. Hidden scale invariance is restricted to the "ordinary" liquid phase not far from crystallization and to the crystalline and supercooled liquid phases, close to the critical point, and in the gas phase this approximate symmetry does not apply. The theoretical framework presented offers a unified perspective on phenomena well-known from experiments and simulations like density scaling of supercooled liquid and polymer dynamics, isochronal superposition, excess entropy scaling, collapse of order-parameter maps, aging, thermoviscoelastic response functions and their connection to unity Prigogine-Defay ratio, melting line invariants, etc. Cover art created by Nis Jakob. See page 10007.

Feature Article

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