

Dimensional transition in layered soft systems

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We consider soft particles that interact via Gaussian pair potentials and investigate systematically ordered equilibrium structures that these particles form in a volume confined by two parallel horizontal walls which are separated by a distance D . Using search strategies that are based on ideas of genetic algorithms we identify the energetically most favourable particles arrangements as we vary the distance D and the number-density ρ : these configurations are characterized by the number of layers that the system forms between the planes and the ordered equilibrium structures within each of the layers. A detailed phase diagram of the system is provided which allows the location of the transition lines between the emerging structures and the number of layers that the system forms.