Nonadditivity of Critical Casimir Forces

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In soft and condensed matter physics, effective interactions may emerge as a result of the spatial confinement of a fluctuating field. For instance, microscopic colloidal particles in a binary liquid mixture are subject to critical Casimir forces whenever their surfaces confine the thermal fluctuations of the order parameter of this solvent, emerging upon approaching its critical demixing point. These critical Casimir forces are theoretically predicted to be non-additive and therefore many-body effects are expected. However, until recently, a direct experimental evidence of this fact was lacking. In this talk I report on the experimental measurement of the associated three-body effects, which provides such an evidence and confirms the non-additive nature of the critical Casimir effect.