Title:	Proposal for a macroscopic test of local realism with phase-space measurements
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Abstract:	We propose a test of local realism based on correlation measurements of continuum valued functions of positions and momenta, known as modular variables. The Wigner representations of these observables are bounded in phase space and, therefore, the associated inequality holds for any state described by a non-negative Wigner function. This agrees with Bell's remark that positive Wigner functions, serving as a valid probability distribution over local (hidden) phase-space coordinates, do not reveal nonlocality. We construct a class of entangled states resulting in a violation of the inequality and thus truly demonstrate nonlocality in phase space. The states can be realized through grating techniques in spacelike separated interferometric setups. The nonlocality is verified from the spatial correlation data that is collected from the screens.
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