Quantum Physics

Spin-like current from phase space distributions

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The spin 0 generalized phase space approach provides a general expression for local current which depends on the choice of distribution function and generally deviates from the Schrodinger current. It is shown that the continuity equation restricts the admissible bilinear distributions such that the current has a unique dependence on the wavefunction and coincides with the non-relativistic limit of the relativistic spin 1/2 current for a spin eigenstate, up to a constant vector. Examples of non-bilinear distributions that have the latter property are given.

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