

Mathematical Physics

Runaway expansion in confined quasi-2D plasmas and vortex fluids

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The confined, quasi-two-dimensional guiding center plasma and a system of interacting line vortices in an ideal fluid are examples of Hamiltonian systems with infinite interaction distances. The existence of metastable states with negative specific is investigated by standard entropy maximization of the thermodynamic limit of vortices as they become infinitesimal and form a continuous field. We find metastable states and suggest that these imply a runaway reaction leading to a rapid expansion of a confined plasma or fluid similar to the rapid collapse of globular clusters in astrophysics.

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