Integrable Hamiltonian Reductions in 2+1-Dimensional Magnetogasdynamics

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Integrable substructure in magnetogasdynamics is investigated via a general elliptic vortex ansatz. Certain universal and Hamiltonian aspects of admitted representations are uncovered. Thermodynamically consistent relations are isolated for which integrable reduction is obtained to systems of Ermakov-Ray-Reid type in 2+1-dimensions. The Ermakov components are shown to describe the time-evolution of the semi-axes of the elliptic cylinder within which the magnetogasdynamic motion is confined.