Radiation Magneto hydrodynamics : prospects for laboratory astrophysics given existing scaling laws

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Scaling laws provide a useful theoretical support to develop new relevant experiments in laboratory [1, 2]. The application of appropriate scaling laws to specific situations give the characteristic scales values which constrain the most the feasibility of laboratory experiments. We developed scaling laws for ideal and non ideal radiation magneto hydrodynamic flows which include the Alfven similarity [3,4]. These scaling laws are adapted to the dynamics of flows produced with powerful lasers coupling to external magnetic fields. [4, 5].
In this work, we apply them to several astrophysical situations (accretion shock, magnetic reconnexion, interstellar shock wave) in order to evaluate and discuss the relevance of potential laboratory experiments.

References :
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