Similarity properties and scaling laws of radiating shocks and accreted column in magnetic cataclysmic variables: The POLAR Project

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Magnetic cataclysmic variables are binary systems containing an accreting magnetic white dwarf which accretes matter from a late type Roche-lobe filling secondary star [1]. The presence of intense magnetic field, radiation and hydrodynamics implies a rich range of behaviours at different spatial and time scales. The radiation collected from these objects mainly comes from an area near the white dwarf surface, named the accreted column, which has a thousand kilometres spatial extension. Consequently it is difficult to observe this zone directly [2,3]. Thus, the possibility of reproducing these phenomena in the laboratory is a real opportunity to increase our understanding of the physics of accreted processes. In this work, we present recent results on the similarity properties of the accreted column. We are able to reproduce an exact scale model of the astrophysical phenomena and examining its behaviours and dynamics in details. Consequently, we investigated the possibility to reproduce experimentally such structures with high energy lasers (the POLAR project). We present here the first results of an experiment which has been performed on the LULI2000 facility.

References

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