

Impact of coronal mass ejection on hot Jupiter atmosphere

MiniGrant RSN2 - Awarded for 19K€.

The Project

We aim to study the **effects** of an impact of a stellar **Coronal Mass Ejection** on **Hot Jupiter atmosphere**.

Our goal is to determine if these phenomena have a role in perturbing the **dynamics** and **structure** of the planetary atmosphere.

The Model

We plan to develop a 3D MHD model of a CME hitting the planetary atmosphere. The model includes:

- An initial unperturbed atmosphere generated using the ATES code;
- Gravity from the planet;
- The stellar wind;
- The CME described as a dense plane moving towards the planet;
- The planetary magnetic field.

Expenses

- Hardware: 7.5k€
- Travel to conferences:
 - Towards other Earths III - Porto.
 - PLATO meeting - Catania.

Deliverables

- 1 Paper submitted to A&A.
- Poster at Towards other Earths III - Porto.

Goals achieved

- Tested and developed the Hydrodynamic (HD) 3D model.
- Performed the HD case for a full simulation.

Critical issues

- Implement the magnetic field effects require more effort than expected.
- Need to find the perfect trade-off between spatial resolution and time of execution for a single run.

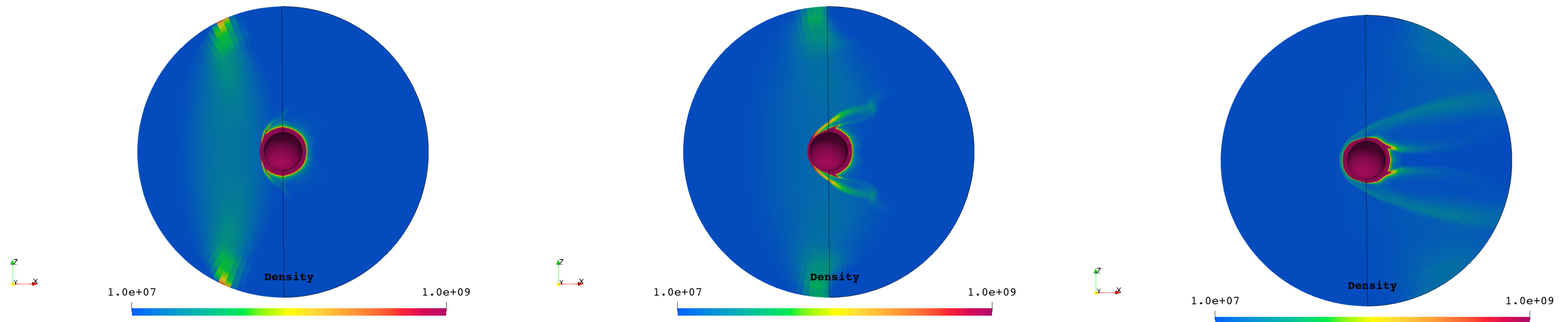


Fig.1: Evolution of the HD model from left to right panels. The images show the density in a plane parallel to the planetary rotational axis. The planet is located at the center. The CME is moving from left to right.