

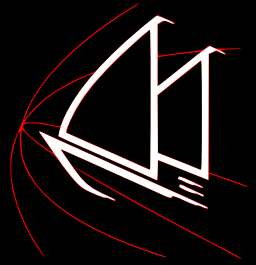


INSTITUTO
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TÉCNICO

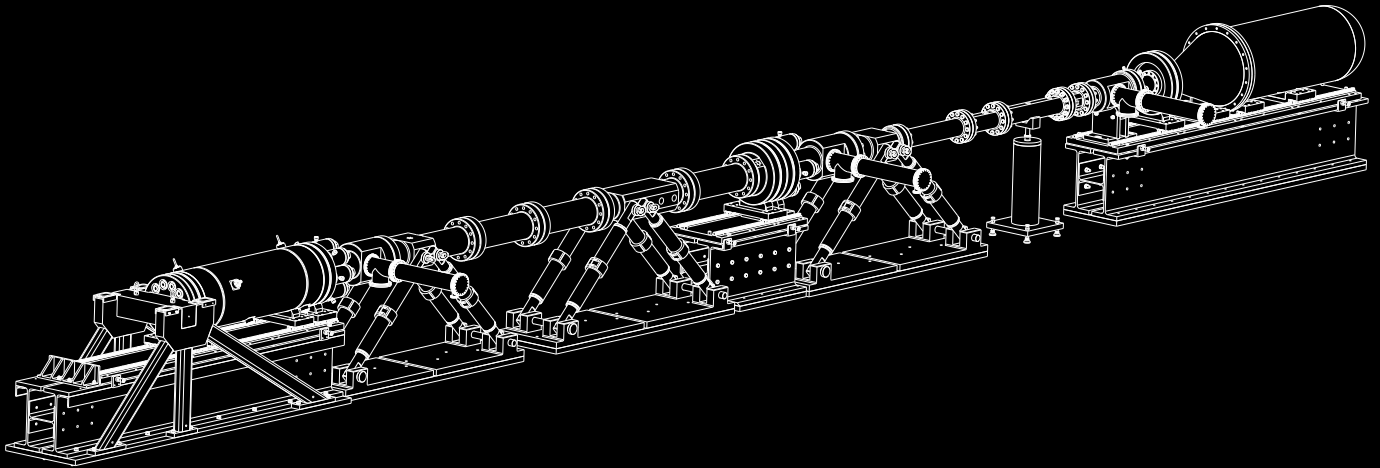


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ESTHER



European Shock-Tube for High Enthalpy Research



A facility for enabling European access to Space

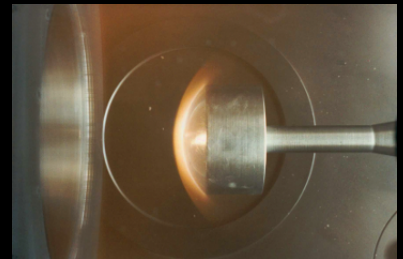
The ESTHER two-stage Shock-Tube, a facility specifically designed for supporting European planetary exploration and Earth return missions, is developed by an international consortium, under funding from the European Space Agency.

The facility is capable of reproducing the conditions of a Spacecraft entry in a planetary atmosphere, allowing validation of the vehicle design, and namely of its thermal protections.

The ESTHER Shock-Tube is a world-class high-performance facility, capable of reaching shock speeds in excess of 12km/s. Its performance is unparalleled in the EU.

The facility deploys a large array of state-of-the-art optical diagnostics, including optical emission and absorption spectroscopy, laser spectroscopy, and microwave interferometry. These diagnostics encompass a large spectral range, from the Vacuum-Ultraviolet to the Infrared regions, and will allow achieving a better understanding on the elementary energy exchange processes taking place in such high-temperature, nonequilibrium plasmas.

ESTHER is managed by the Institute of Plasmas and Nuclear Fusion, and Associated Laboratory of the Instituto Superior Técnico, and is located on the campus of Sacavém, in the outskirts of Lisbon, Portugal.



Example of a Shock-induced plasma



ESTHER hosting building

Facility Specifications

Length: 16m

Test-section diameter: 80mm

Shock Velocities: 4-12⁺ km/s

Pre-shock pressures: 0.1-100⁺ mbar

Website:

<http://esther.ist.utl.pt>



ESTHER International consortium

Reaching the Hypersonic Plasmas Laboratory

By Car

GPS coordinates: 38° 48'41.06"N / 09° 5'36.10"W

From the Airport

Take the red subway line and exit at the Oriente station
Climb up to the train station and take the train direction Azambuja. Exit at Bobabela station.
Exit the station and walk past the Leclerc supermarket
The Nuclear and Technical campus entrance is located in front of the round-point.

From the City center

Take the red subway line and exit at the Oriente station
Follow the same instructions as above.



Campus entrance

