Thesis Proposal for the Master's Degree in Physics

Title: Evolution of Sungrazing Comet Tails at the perihelion transit

Abstract (max 10 lines):

Space coronagraphs have observed thousands of sungrazing comets plunging in the solar corona. Only in a few cases, some comets were observed to survive the perihelion transit. At that stage, the behaviour of plasma and dust tails is strongly affected by the physical conditions of the solar corona, and their dynamics can be used to infer the magnetic structuring of the solar corona, which is inaccessible by direct measurements. I propose a research thesis on the study of the transits of Comet Lovejoy (2011) (Nisticò et al. 2022) and Comet ISON (2013) (Nisticò et al. 2018) using data from the STEREO mission and the Solar Dynamics Observatory. The student will analyse the data to get the physical parameters of the tails and compare the results with those from theoretical models by a test-particle numerical code, which simulates the dynamics of cometary ion and dust particles.

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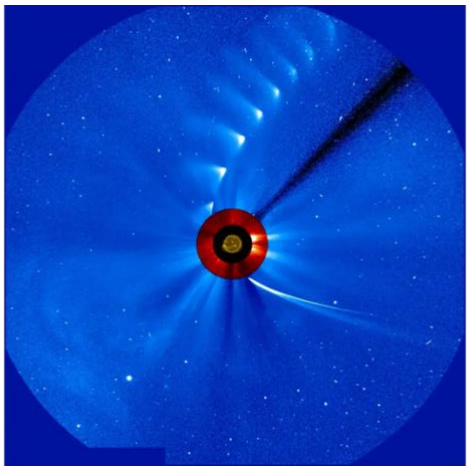
Laboratory where the thesis is carried out: AstroPlasmiLab
(https://fisica.unical.it/storage/laboratories/877/)

Any participating external structures:

Type of thesis:
☐ compilation
☒ research:
specify if ☐ experimental ☒ theoretical or ☒ data analysis



Composite image of the transit of Comet ISON seen from SoHo/LASCO. Courtesy of NASA.