



SEMINAIRE régulier du Service d'Astrophysique

NUMERICAL STUDY OF THE VISHNIAC INSTABILITY IN SUPERNOVA REMNANT

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(Observatoire Paris-Meudon)

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11h00

The Vishniac instability is supposed to explain the fragmentation and the filamentation of the thin shell of shocked matter in radiative supernova remnants. However the implication and the consequence of this specific process on the complex morphological evolution of supernova remnants is not fully demonstrated. We have realized 2D numerical simulations of perturbed blast waves propagating into a homogeneous ambient medium to better understand the mechanism of the Vishniac instability. The HYDRO-MUSCL 2D hydrodynamics code has been used to trigger the thin shell perturbation in plane-parallel geometry and spherical geometry.

In this talk I will show that we have obtained the Vishniac overstability as predicted by the theoretical analysis. This process consists of an oscillation with an amplitude and period growing in time. We have tested the effect of specific parameters on the mass variation of a given region with a parametric study performed on the Titane supercomputer. We found that the perturbation is damped after a few oscillations for all sets of parameters. Thus we conclude that in our model the Vishniac instability does not allow the fragmentation of the thin shell due to effects not taken into account by the theoretical analysis.



Un café sera servi 15 minutes avant le séminaire

Ce séminaire aura lieu au CEA Saclay – Orme des Merisiers –bâtiment 713, Salle Galilée