Service d'Astrophysique
SÉMINAIRE

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Jeudi 12 février 11h00

CEA Saclay, Orme des Merisiers Bât 709, p 220

ON THE ORIGIN OF COSMIC RAYS : DIFFUSIVE SHOCK ACCELERATION IN THE NOVA RS OPHIUCHI AND THE RADIO SUPERNOVA SN 1993J

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Galactic cosmic rays are widely believed to be accelerated in expanding shock waves initiated by supernova explosions. The theory of diffusive shock acceleration of cosmic rays is now well established, but two fundamental questions remain partly unanswered: what is the acceleration efficiency, i.e. the fraction of the total supernova energy converted to cosmic-ray energy, and what is the maximum kinetic energy achieved by particles accelerated in supernova explosions? To try to answer these questions, we have first studied particle acceleration in a "miniature supernova": the recurrent nova RS Ophiuchi. After a presentation of this object, I will discuss the prospects for the detection with the Fermi Gamma-ray Space Telescope of high-energy radiation from other recurrent novae. In a second part of my talk, I will show that new pieces of information concerning the theory of diffusive shock acceleration can be obtained by studying the radio emission from recent extragalactic supernovae. For the first time, a model taking into account nonlinear effects of the acceleration process has been applied to the radio data of the famous supernova SN 1993J. The results of the model provide support to the scenario that most of the Galactic cosmic rays are accelerated by massive stars exploding into their own wind.

Le cafe sera servi 10 minutes avant
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