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On the instabilities and scattering of diffusive shock acceleration

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Abstract content

The non-linear back reaction of accelerated cosmic rays at a non-relativistic shock front leads to the formation of a smooth precursor with a length scale corresponding to the diffusive scale of the energetic particles. The instabilities present in these modified shocks may play a crucial role as past theoretical work has shown. First, it was claimed that shocklets that could be created in the precursor region of a specific width might energize few thermal particles to sufficient acceleration and second, some precursor regions may act as confining large angle scatterers for very high energy cosmic rays. Our aim here is to investigate numerically these claims by constructing a Monte Carlo code simulating the above conditions which could throw further light to the exact mechanism of efficiency, particularly in the case of highly oblique shocks as these appear in nature much more often.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 2 (OG part 1), pages 271-274

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