

INSTABILITY AND RECONSTRUCTION OF RC-DOMINATED SHOCK WAVES: OBSERVATIONAL ASPECTS

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Abstract

Observational consequences of the effects of nonlinearity and nonequilibrium, which accompany particle acceleration by strong collisionless shock waves from supernova explosions, are analysed. They are: (a) the existence, under fixed external conditions, of several shock states, which differ appreciably in their global compression, profile shape, spectra of accelerated particles, and plasma temperature behind the front; (b) the existence of stable shock states from which the system is capable of jumping into other states that differ strongly from the original one ("nonequilibrium phase transition"); (c) the presence of unstable states of collisionless shock waves. The predicted effects can be studied by observing soft thermal X-ray radiation from the front and synchrotron radiation by accelerated particles. The synchrotron radiation can provide information on spectra of accelerated particles, while the X-ray radiation contains information on temperature and number density of plasma behind the front.