

The Summer Undergraduate Research Fellowship (SURF) Symposium
4 August 2016
Purdue University, West Lafayette, Indiana, USA

The Turning-Off of Supernova Remnants:

The Transition to the Radiative Phase

Ryan A, LaZur, Rodolfo Barniol Duran, and Dimitrios Giannios
Department of Physics & Astrophysics, Purdue University

ABSTRACT

Supernovae are amongst the most energetic events in the Universe. Understanding the different stages of the life of a supernova is currently one of the main objectives in astrophysics. During a supernova explosion, material with mass several times that of the Sun is ejected with a speed about 1/10 that of light. In current models, the transition from the Sedov-Taylor to the radiative phase is assumed to be almost instantaneous, which is not entirely accurate. Here the physics of the transition to the radiative phase will be revisited. Observations indicate that the supernova ejecta remains bright in the radio band until it enters the radiative phase; then it gradually fades away. We will explore the role of the shock Mach number and the efficiency of synchrotron radiation and associated radio emission in that turning-off. A monte-carlo technique has been implemented to simulate the supernovae history in a galaxy. We apply this technique to the radio observations of the supernova remnants in the Magellanic Clouds..

KEYWORDS

Radiation mechanics, non-thermal – methods, analytical – supernovae, general