

A STUDY OF SHOCK EXCITED GAS IN THE SUPERNOVA REMNANT IC443

Glenn J. White, Ruth Rainey
 Queen Mary College, University of London, England
 Saeko Hayashi, Norio Kaifu
 Nobeyama Radio Observatory, Japan

Extensive molecular line observations have been made of a small region of the supernova remnant IC443 that is strongly interacting with, and shocking a nearby molecular cloud. The observations obtained at the Nobeyama 45-m, Kitt Peak 12-m, and UKIRT 3.8-m telescopes include detailed maps at 15 and 30 arc second resolution in the CO ($J = 1-0$) and 2-1 lines, and spectra in the CO ($J = 3-2$) transition. The shocked gas is characterized by a low density and a high temperature. The spatial distribution of the CO shows a remarkable correspondence to maps of shocked molecular hydrogen, and contains a very complex velocity structure, indicating extensive fragmentation. The masses of the clumps are 0.1-0.3 solar masses, and as a system are dynamically unstable. In addition we report a comprehensive molecular line survey towards two of the fragments in IC443, one characterized by the presence of high velocity, and the other by low velocity gas. These results are discussed in relation to the properties of shock-excited gas and theoretical shock-chemistry models. Several other regions in IC443, which appear as strong far-IR emitters on IRAS images of the remnant, were searched, and also found to be strong emitters of characteristic shocked-gas profiles.

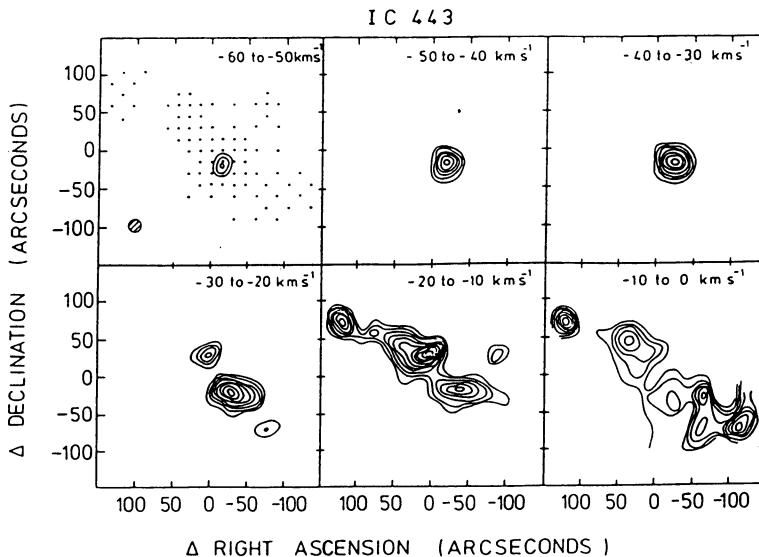


Fig. 1