

Iron and dust in the supernova remnant IC443

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IC443 is a Galactic supernova remnant (SNR) which shows a strong interaction with the surrounding interstellar medium (ISM). In IC443, shocks destroy pre-existing dust grains and release the elements depleted onto them. Thus IC443 is an excellent laboratory to investigate processing mechanisms and chemical compositions of dust via interaction with shocks.

We observed IC443 with the SIRIUS, the near-infrared camera on the IRSF 1.4 m-telescope, using the narrow-band filters tuned for the [Fe II] 1.257 and 1.644 μm , Pa β , and H₂ 1-0 S(1) lines. We also observed IC443 by all-sky surveys with AKARI in the warm and cool dust emissions. We reveal that the [Fe II] filamentary structures distribute over the observed regions (30' x 35'). We also detect Pa β from a part of the region where the [Fe II] lines are detected as well as H₂ line from the southern region of IC443. In general, iron which emits the [Fe II] line in SNR is thought to be released from dust by destructive shock. However we cannot rule out a possibility that iron of an ejecta origin is included. To understand the origin of iron, we compared the spatial distribution of the [Fe II] line with that of warm dust emission.

In this presentation, we discuss how iron in dust is released to the ISM via shocks, comparing our observational results with the suggestions given by model calculations. We also discuss an amount of iron which can be formed by a progenitor of IC443.