On the Fe-rich knots in Cassiopeia A

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Abstract

We investigate the origin and evolution of the Fe-rich x-ray knots discovered by Chandra in the SE quadrant of the supernova remnant Cassiopeia A. In contrast to the optical Fast Moving Knots and the x-ray Si-rich knots, which are most likely currently undergoing an interaction with the reverse shock, we believe from their location within the remnant and their high ionization times that the Fe-rich knots encountered the reverse shock early in the evolution of Cassiopeia A.

For various initial densities, element compositions and reverse shock times, we follow the ionization balance and radiative cooling through to the current time, for a representative selection of the knots observed. By matching our simulation results to the observed values of temperature and ionization time we attempt to constrain the time of reverse shock passage for each knot and hence infer its ejecta mass coordinate.

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