

Discovery of the correspondence between intra-cluster radio emission and a high pressure region detected through the Sunyaev-Zel'dovich effect

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We analyzed new 237 MHz and 614 MHz GMRT data of the most X-ray luminous galaxy cluster, RX J1347-1145. Our radio results are compared with the MUSTANG 90 GHz Sunyaev-Zel'dovich effect map and with re-processed Chandra and XMM-Newton archival data of this cluster. We point out for the first time in an unambiguous way the correspondence between a radio excess in a diffuse intra-cluster radio source and a hot region detected through both Sunyaev-Zel'dovich effect and X-ray observations. Our result indicates that electron re-acceleration in the excess emission of the radio mini-halo at the center of RX J1347-1145 is most likely related to a shock front propagating into the intra-cluster medium.

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