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The IIT Indore Radio Telescope Array for Cosmology SIDDHARTH MALU, Indian Institute of Technology Indore, PETER TIMBIE, University of Wisconsin-Madison, LUCIO PICCIRILLO, Manchester University, GREGORY TUCKER, Brown University — Galaxy clusters grow by mergers with other clusters and galaxy groups, which create shock waves in the ICM that can accelerate particles to extreme energies and lead to "cold fronts" with narrow pressure structures with low particle density. These regions can be studied best using the SZ effect, which offers the most direct probe of pressure enhancements along shock fronts. In order to understand the physics of shock fronts and cold fronts in galaxy clusters, it is therefore crucial to produce high-resolution SZ effect images of merging clusters. Therefore, a SZ effect study of cluster mergers that exhibit shock structures as radio relics is necessary as a first step towards building confidence in emerging merger models. Our recent observations demonstrate anomalously high diffuse emission from cluster mergers at high (>10 GHz) frequencies – these challenge current paradigms of diffuse emission from clusters. There is, however, no radio telescope or observatory designed specifically for characterizing large-scale structure like galaxy clusters. Radio observatories have dishes that are too large to cover a large enough area on the sky that might encompasses the entirety of mergers of large/massive clusters. This is the Scientific and Technical void that RTAC aims to fill.

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