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Multi-frequency Radio Study of the Dissociative Merger Cluster CIZA J0107.7+5408

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We present new radio and X-ray observations of the complex CIZA J0107.7+5408 (CIZA0107), a large, roughly equal mass, post-core passage, dissociative binary merger at redshift $z=0.1066$. CIZA0107 hosts two subclusters, with optical galaxy density peaks offset from their associated X-ray density peaks. The X-ray morphology interpretation also shows an elongated, disturbed system. Merging clusters tend to host diffuse radio halos, relics, and mini-halos powered by the shocks and turbulence from the merger, and CIZA0107 is no exception, with double peaked diffuse radio emission, as well as possibly one or more halos and multiple relics and/or phoenix sources. We observed with the purpose of combining new deep X-ray data with new VLA data, which will allow us to infer the distribution of the particle population of the system, and investigate the details of the particle acceleration. We present 240-470 MHz (P band) and 2.0-4.0 GHz (S band) VLA observations of CIZA0107 in all four telescope configurations (A-D). Images obtained using this data have allowed us to map the full extent of this complex system of diffuse radio sources, and to investigate their morphology. The breadth of observations has also allowed us to measure diffuse emission more accurately by removing the contribution from contaminating discrete radio sources. In this way, we have better constrained the shape of the integrated radio spectrum of the diffuse emission. We also present a study of separate components characterized by different spectral index properties in the overall diffuse emission. Ultimately, we will present a detailed analysis of the multi-frequency radio data, in comparison to the new Chandra data.