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## The Multiwavelength Properties of Arp 220

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When analyzed together, radio and gamma-ray observations make for a very powerful tool for studying and diagnosing extragalactic cosmic ray populations. The recent gamma-ray detection of the ultra-luminous galaxy Arp 220 is well above past predictions, indicating evidence of a very large cosmic ray population. Whether the star formation or an active galactic nucleus is the source of the additional cosmic, there is a clear excess of gamma-ray emission in comparison to the observed radio flux. Here, we analyze the amount of energy necessary to power the observed gamma-ray flux and compare with traditional tracers of the star-formation rate. We also explore possible mechanisms for lowering the corresponding radio flux and check for consistency with observed properties of the interstellar medium.

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