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Presentation Requested: poster
Category: Evolution of the Interstellar Medium and Star formation over Cosmic Time
Question: How well do we understand the feedback from starbursts and outflows? What role can ALMA play in better constraining feedback?

High-resolution radio continuum measurements of the nuclear disks of Arp 220

We present the most robust measurement to date of the structure of the nuclear disks in the closest ULIRG, Arp 220. We use continuum observations at 6 and 33 GHz using the recently upgraded Karl G. Jansky Very Large Array to achieve high angular resolution with little or no concerns for opacity, allowing us to estimate the true distribution of the star formation in these systems. Based on the new constraints on the size of the emitting region at 33 GHz and the flux density measurements at 6 and 33 GHz, we show the implications for physical conditions in the nuclear disks, the potential role of feedback, and the nature of the energy source. The small measured sizes allow us to estimate the highest luminosity surface densities and star formation rate surface densities measured, to our knowledge, for any star-forming system. The high luminosity surface densities place the system near the limiting case of a "maximal starburst" in which radiation pressure is just balanced by self-gravity. The small measured sizes also imply that by wavelengths shorter than $\lambda = 1$ mm, dust absorption effects must play an important role in the observed light distribution. Our results offer no clear evidence of an active galactic nucleus dominating the emission at 33 GHz in either nucleus. Finally, Arp 220 is transparent only in the frequency range ~ 5 to 300 GHz, being opaque below 5 GHz due to free-free absorption and above 300 GHz due to dust absorption; 33 GHz is in the transparent regime, where we can recover most of the emitted flux.