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Resolving the Chemistry of Molecular Gas that Fuels Luminous Starburst Galaxies[1] DAVID MEIER, New Mexico Tech, JEAN TURNER, University of California, Los Angeles, CRYSTAL ANDERSON, New Mexico Tech — Energy input from massive stars profoundly impact on how starburst galaxies evolve. Both the triggers of and feedback from star formation manifest themselves in the gas chemistry. We use millimeter interferometry to obtain high spatial resolution maps of CO, HCO^+, CCH, NNH^+, HNCO, CH_3OH and SiO, toward the starbursts, Maffei 2, M 82, IRAS 04296+2923 and Arp 220. Dramatic variations in gas chemistry are observed both within the individual galaxies and from galaxy to galaxy. These variations correlate with star formation and gas dynamics. CO isotopologues are used to constrain the evolutionary history of star formation. Species preferentially formed (CCH) and destroyed (NNH^+) in the presence of strong UV radiation map out where energy input from the massive stars dominate. CCH abundances are correlated with star formation rate, except in the most extreme starburst, Arp 220, whereas NNH^+ abundances drop, except for Arp 220. The abundance anomalies in Arp 220 hint that the molecular medium in the most extreme starbursts is different. HNCO, CH_3OH and SiO locate shocks due to bars and galaxy-galaxy mergers in these systems. Comparisons between these species suggest shock strength does not change across bars, but does for merger remnants.

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David Meier
New Mexico Tech

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