Stellar and Gas Dynamics in Ultraluminous Mergers

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A significant new element in the exploration of high-z star formation has recently emerged with the COBE detection of an extragalactic submm background. Its energy density is at least as large as that of the combined light of all galaxies emitting in the optical/UV, and it appears to be dominated by very luminous ($>10^{12}$ $L_{\odot}$) galaxies at z>1. It is likely, therefore, that very luminous dusty starbursts contribute significantly to the cosmic star formation rate at z>1. FIRST will resolve the sources comprising the submm background, and determine the statistical nature of these galaxies. Very high resolution detailed spectroscopy of individual sources will be crucial to determine their evolutionary states and their dynamical masses. We report here on VLT and Keck H- and K-band spectroscopy of the local analogs of this high-z population: the ultraluminous infrared galaxies (ULIRGS). The sources in our sample are all in a moderately advanced state of merging. We find that their stellar dynamics are relatively relaxed, and that the merger remnants have velocity dispersions comparable to those of elliptical galaxies. For those sources with well-separated nuclei, we observe rotation in the individual nuclei, indicating that they are still dynamically independent. We will put our observations in the context of the evolutionary scenario where ULIRGs may evolve into ellipticals through merger induced dissipative collapse, perhaps passing through a QSO phase on their way.