

A dynamic view of the star formation process in galaxy mergers

Many galaxy mergers are characterized by high gas and star formation rate surface, with gas depletion times less than 100 Myr. These extreme properties must be driven by changes in the structure of the molecular gas, which provides the fuel for star formation. In this talk, I will compare recent ALMA observations of two nearby mergers on cloud scales (50 pc) with similar observations for 70 nearby spiral galaxies from the PHANGS-ALMA survey. Both pixel-based and cloud-finding analyses show that the molecular clouds in the merger galaxies have physical properties (e.g. gas surface densities, turbulent pressure) that are significantly larger than those of molecular clouds in undisturbed spiral galaxies. I will discuss how comparing the two merger systems with each other, along with an analysis of galaxy mergers from the FIRE simulations, can provide insight into how cloud properties and their associated star formation can evolve with merger phase. I will end by highlighting some potential difficulties in linking “instantaneous” measures of cloud properties with star formation rates averaged over >10 Myr in these rapidly evolving systems.