Title: The Milky Way Resolved Kennicutt-Schmidt Relation: A Case Study in 6 Massive Star Forming Regions

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Abstract: The empirical Kennicutt-Schmidt relation compares the star formation rate (SFR) surface density to the surface density of gas in external galaxies. We present the results of a case study of the Kennicutt-Schmidt relation in a sample of massive Galactic star forming regions. We employ a combination of near-infrared and Spitzer IRAC observations to conduct a census of the young stars associated with each cloud. We compare two methods to determine the mass of this stellar population. First, we determine the best fitting physical parameters (stellar mass, age, and line of sight extinction) for each source using the Robitaille et al. (2006) model grid. Second, we compare synthetic clusters to the full distribution of observed YSOs to determine the mass sensitivity of our observations. For both cases we adopt a Kroupa IMF to fill in the remainder of the unobserved (low mass) stellar population. We compare the stellar census SFR measurements to extragalactic SFR tracers that rely on monochromatic luminosities using observations from MSX, IRAS, and Herschel. We combine the SFR measurements with two methods for determining the gas surface density based on the dust emission / extinction. Finally, we also compare star formation rate scaling relations for entire molecular clouds vs. the relation between the star formation rate and gas surface density within an individual cloud. We find that the SFR vs. gas density varies significantly for measurements averaged over entire GMCs. However, SFR vs. gas density within a given star forming region shows similar behavior for low mass clouds, massive star forming regions, and in extreme cases of star formation such as mini-starburst clusters.