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LINKING THE FORMATION OF MOLECULAR CLOUDS AND HIGH-MASS STARS : A MULTI-TRACER AND MULTI-SCALE STUDY

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SAp

Star formation is a complex process involving many physical processes acting from the large scales of the galaxy to the small scales of individual stars. One of the questions in star formation is the detailed mechanism of the formation of molecular clouds and the impacts of this process on the formation of stars, especially high-mass stars. Another topic which is highly debated is the gas to star-formation-rate (SFR) relation of individual molecular cloud and the comparision of this relation from the Galactic scales to extragalactic scales. To tackle these two questions, we investigate the molecular cloud formation and the star formation activities in the W43 molecular cloud complex (area 104 pc2) and the G035.39-00.33 filament (area 8 pc2). The first goal is to look for indications that the converging flows theory has formed the W43 molecular cloud since it is the first theory to explain star formation self-consistently, from the onset of molecular clouds to the formation of seeds of (high-mass) stars. The second goal is to infer the connections of the gas-SFR relations of these two objects to those of other galactic molecular clouds and to extragalactic ones. These two regions are forming stars very efficiently and potentially forming high-mass stars as a result of different converging flows acting on these regions. The proposition that converging flows have large impacts on these regions have been confirmed by extended SIO emissions detected in these two regions. In addition to that, W43 hosts a large scale HI gas envelope surrounding W43, which may be the remnant of atomic gas that formed the molecular cloud.

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