ABSTRACT ONLY

THE AGE-PRO ALMA SURVEY: A GLIMPSE INTO THE GAS EVOLUTION IN PROTOPLANETARY DISK

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The fundamental question of how the gas and solids in protoplanetary disks evolve with time remains unanswered. However, the ongoing ALMA Large Program AGE-PRO ("ALMA survey of Gas Evolution in PROtoplanetary disks") was designed to answer this question for the gas component. AGE-PRO will trace the evolution of gas disk mass and size throughout the lifetime of disks, using a well-defined sample of 30 disks between 0.1 and 10 million years old. By studying a large sample of disks at different ages, AGE-PRO will be able to identify the key factors that drive the evolution of gas disks and to better understand how these disks ultimately give rise to planets.

Here, we present the preliminary analysis on Upper Scorpius and Ophiuchus, the oldest and youngest regions in our sample, respectively. For Upper Scorpius we have imaged gas and continuum emission, and generated disk-integrated line fluxes and radial intensity profiles for all lines and for the continuum, in all 10 disks selected. ^{12} CO emission is ubiquitous across the entire sample, with detection in all observed sources. In contrast, transitions of its heavier isotopologues, ^{13}CO (2-1), and C^{18}O (2-1), exhibit lower detection rates of 60% and 40%, respectively.

Additionally, we have analyzed the young Ophiuchus star forming region to examine the nature of the gas rotation with CO isotopologues. We are deriving rotational profiles from the PV diagrams and the size of Keplerian disks for Class I/FS sources.

These results will establish a foundation for understanding the global structure and evolution of protoplanetary disks. This will provide essential context for future in-depth studies of planet formation processes in disks.

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