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Translucent, High-Latitude, Molecular Clouds in the Milky Way

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More than 100 molecular clouds are detected in the lowest rotational transition of carbon monoxide are known to exist at high Galactic latitudes ($|b| > 25$ degrees; $b = 0$ degrees lies along the Galactic midplane). For the most part, they represent a population of small interstellar clouds that are likely the local, high-latitude extension of the molecular distribution detected by the Galactic plane surveys (primarily Giant Molecular Clouds or GMCs). The high Galactic latitude and the thinness of the Galactic disk constrain the bulk of the high-latitude molecular clouds to be nearby (i.e., less than a few hundred parsecs away). The vast majority of these clouds are of the translucent variety, that is, with dust opacities in the range of 1-5 magnitudes and a chemistry that is dominated by photoprocesses rather than collisional reactions. Translucent clouds differ from the more common GMCs and dark molecular clouds in that they seldom form stars and self-gravity plays a significantly lesser role in structuring them. Thus, these clouds may still bear the original signatures of the atomic gas flows that created them. In this case, their formation mechanisms would differ substantially from those thought to apply to GMCs.