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The dynamical state of star forming molecular gas as viewed by PHANGS

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The kinematics of molecular gas on cloud scales are a sensitive probe of the boundary conditions for star formation. Until recently, such measurements were only available for cloud populations within the Local group (including our own MW). But now, new survey capabilities are expanding our view of gas motions to a greater diversity of galactic environments, providing unprecedented constraints on the process of star formation in prototypical 'star forming main-sequence' galaxies. These observations hold the key to building a full picture for the characteristic inefficiency of star formation. I will summarize results from the PHANGS/ALMA survey that suggest a more dynamic view of the star-forming medium than the idea of cold, dense gas organized into discrete virialized objects. Strong deviations from approximate virialization consistently occur in environments with high shear, short orbital times and deep stellar potential wells, indicating that the gas in these regions is strongly coupled to the galactic potential.

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