

R03a **Should we be asking molecular clouds how spiral arms are made?**

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Unveiling the processes governing star formation in nearby spiral galaxies is key to understanding their evolution, as well as the structure of our own Milky Way. How exactly spiral arms in particular impact the growth of the star forming interstellar medium is of key interest, as they act as concentrated sites of star formation activity. However, the exact nature of these spiral arms remains somewhat elusive, with numerous different theories developed to explain their existence and dynamics. We present results of hydrodynamical simulations of the star forming interstellar medium in disc galaxies subjected to different kinds of spiral perturbations. The goal is to investigate whether certain spiral theories leave an imprint on the resulting accumulation of dense gas into massive molecular clouds, such as altering their mass function or the magnitude of their velocity dispersion. We find that how a spiral is made has a very minimal effect in changing the cloud properties. So long as a grand design spiral arm exists, it will impact the cloud population in a very similar way, regardless of the origin of the arms. We do however find tentative evidence of a change in the magnitude of cloud angular momenta, being relatively highest in arms induced by a galactic tidal interaction and lowest when the arms are generated by instabilities in the disc that rapidly wind up over time.