

Relation between environment and star cluster formation and evolution: an empirical relation

Morgan Fouesneau

Max-Planck Institute for Astronomy, Germany
(fouesneau@mpia-hd.mpg.de)

In the classical picture of stellar formation, it is admitted that a large fraction of stars, if not all, form in clusters. However, we observe incoherent distributions of young stars with purely clustered star formation in multiple galaxies. These observations suggest two possible variations from the canonical picture. On one hand, stars form in clusters, which almost instantaneously dissolve and disperse stars into the field. Stars would move away from their birth place on very short timescales (< 1 Myr) and most likely no star cluster would survive. On the other hand, if unbound star formation dominates, it implies that stars can also form in diffuse gas regions. Hence the star formation intensity would not correlate with the gas content in galaxies in opposition with that star formation traces the densest gas regions such as spiral arms.

Based on the unique PHAT cluster catalog spanning various star formation intensities and environments in M31, such as spiral arms, ring, and inter-arms, I will present the measurement of the evaporation rate and initial mass function of clusters as a function of cluster mass, age, and especially emphasize significant variations with environment.