

From star clusters to field populations: survived, destroyed and migrated clusters



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Do the majority of stars form in gravitationally unbound groups?

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While some young stars are clustered, many other young stars are observed as dispersed, non-gravitationally bound groups, or in complete isolation. Using N-body simulations, we study dispersal of young open star clusters of a wide range of initial masses. We find that observational data are consistent with the assumption that all stars form in initially embedded star clusters, which lose most of their members at their early age as the consequence of expulsion of the residual gas. Our model predicts that the fraction of young stars (age less than 10 Myr) to be observed in gravitationally bound clusters shows only a weak dependence on the star formation rate per unit area of the galaxy. This result contrasts to the analytical work due to Kruijssen 2012, which predicts that the fraction of young stars in gravitationally bound clusters is a strong function of the star formation rate of the galaxy, and that only the galaxies with high rates of star formation form a noticeable fraction of stars in clusters.

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