

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



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Simulating the population of young massive stellar clusters in the Milky Way.

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The recent detection of large diffuse γ -ray halos in coincidence with a dozen young massive stellar clusters (YMSCs) has strengthened the hypothesis of stellar clusters as cosmic ray factories and γ -ray sources. Noticeably, the observed γ -ray emission is, on average, remarkably extended ($\sim 1\text{-}3^\circ$) and of the same size as the dimension of the superbubble developed by YMSCs. Such a large diffuse emission, characterized by a low surface brightness, suggests that non-resolved YMSCs could significantly contribute to the diffuse γ -ray emission observed along the Galactic plane. To estimate this contribution, a robust modeling of both the galactic population of YMSCs and the feedback from stellar winds in terms of wind power and mass loss rate is required. In this work, we present a novel method for simulating a synthetic population of galactic YMSCs based on observations of local stellar clusters. We additionally estimate the power of stellar wind and mass loss rate by building a mock stellar population for every cluster and empirically modeling the stellar wind physics.

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