Globular and open clusters are home to stars of various ages, with open clusters having stars that are approximately the same age. Interstellar dust, while important in the formation of stars, can often cause issues in observing the ages of the stars when viewing them form earth. Understanding the formation of stars in these clusters is pivotal in understanding how these formations behave inside of a galaxy. We are proposing utilizing data from the Hubble Space Telescope via the WFC3/UVIS UV broadband and imagery from the Treasury Program LEGUS to identify clusters that showcase their behavior and impact on the surrounding galaxy. This will allow us to visualize star clusters whose molecular structures and age can give us more information about their galaxy. This is pivotal in understanding galaxias formation and density to understand how they may interact with both other galaxies and their internal clusters. This will allow us to use the data for future stellar structure studies as structures change.

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Original

We present a study of the hierarchical clustering of the young stellar clusters in six local (3–15 Mpc) star-forming galaxies using *Hubble Space Telescope* broadband WFC3/UVIS UV and optical images from the Treasury Program LEGUS (Legacy ExtraGalactic UV Survey). We identified 3685 likely clusters and associations, each visually classified by their morphology, and we use the angular two-point correlation function to study the clustering of these stellar systems. We find that the spatial distribution of the young clusters and associations are clustered with respect to each other, forming large, unbound hierarchical star-forming complexes that are in general very young. The strength of the clustering decreases with increasing age of the star clusters and stellar associations, becoming more homogeneously distributed after ∼40–60 Myr and on scales larger than a few hundred parsecs. In all galaxies, the associations exhibit a global behavior that is distinct and more strongly correlated from compact clusters. Thus, populations of clusters are more evolved than associations in terms of their spatial distribution, traveling significantly from their birth site within a few tens of Myr, whereas associations show evidence of disruption occurring very quickly after their formation. The clustering of the stellar systems resembles that of a turbulent interstellar medium that drives the star formation process, correlating the components in unbound star-forming complexes in a hierarchical manner, dispersing shortly after formation, suggestive of a single, continuous mode of star formation across all galaxies.