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Supernova-rates for different galaxy types

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The stellar initial mass function (IMF) integrated over an entire galaxy is an integral over all separate star-formation events. Since most stars form in star clusters with different masses the integrated IMF becomes an integral of the (universal or invariant) canonical stellar IMF over the star-cluster mass function. This integrated IMF is steeper (contains fewer massive stars per G-type star) than the canonical stellar IMF. Furthermore, observations indicate a relation between the star-formation rate of a galaxy and the most luminous stellar cluster in it. This empirical relation can be transformed into one between the star-formation rate of a galaxy and a maximum cluster mass. The assumption that this cluster mass marks the upper end of a young-cluster mass function leads to a connection of the star-formation rate and the slope of integrated IMF for massive stars. This integrated IMF varies with the star-formation history of a galaxy. Notably, large variations of the integrated IMF are evident for dwarf galaxies. One important result is that the supernova rate is supressed relative to that expected for a Salpeter IMF, and that dwarf galaxies have a supressed supernova rate relative to massive galaxies. For dwarf galaxies the supernova rate also varies substantially depending on the galaxy assembly history.

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