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Sub-Gyr variability around the SFMS and its contribution to the scatter

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Abstract

We aim to measure the evolution of individual galaxies around the Star Formation Main Sequence (SFMS) during the last Gyr as a function of their stellar mass to quantify how much of its scatter is due to short-term variability.
We derived star formation histories using full spectral fitting for a sample of 8,960 galaxies from the MaNGA survey to track the position of the galaxies in the SFMS during the last Gyr.
The variability correlates with both the stellar mass of the galaxies and their current position in both the SFMS and the MZR, with the position in the latter strongly affecting variability in SFR. While most of the fluctuations are compatible with stochasticity, there is a very weak but statistically significant preference for 135-150 Myr time-scales.
These results support a strong self-regulation of SFR within galaxies, establishing characteristic intensities and time-scales for bursts of star formation and quenching episodes.
We also find that short-term variability cannot account for the entirety of the scatter in the SFMS. It appears to originate to a similar degree in short-term variability and long-term (halo-level) differentiation and fits predictions from models.

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