MASS-METALLICITY RELATION AS A FUNCTION OF MORPHO-KINEMATICS IN EAGLE SIMULATIONS

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Abstract / We study the stellar mass-gas-phase metallicity relation (MZR) as a function of the internal kinematics and morphology of galaxies in EAGLE cosmological simulations. According to our findings, at a given stellar mass ($M_\star$), gas-phase metallicity shows a clear secondary dependence on internal kinematics of galaxies and a more modest dependence on their morphologies. At the low-mass/high-mass end ($M_\star \lesssim 10^{10}$ M$_\odot$/$M_\star \gtrsim 10^{10}$ M$_\odot$), systems with higher rotational support show lower/higher metallicities, on average. In addition, low mass galaxies with more spheroidal stellar components tend to be more metal-enriched. More massive galaxies tend to exhibit flatter morphologies, with prolate systems being less metal-enriched, on average. As z increases, those aforementioned dependences of metallicity on kinematics and morphology tend to become weaker at low masses and stronger at high masses. These trends are consistent with the dependence of the MZR on gas fraction, star formation rate and stellar age, and the relation of the latter quantities with galaxy morpho-kinematics.

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