

What turns galaxies off? The evolution of the old, red and dead galaxy population in a Lambda CDM Universe

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Models of galaxy formation in a cosmological context correctly predict, at least qualitatively, the existence of disk-dominated and spheroid-dominated galaxies at the present day. The same models, including prescriptions for gas cooling, star formation and stellar feedback incorrectly predict that all galaxies should be forming stars at rates sufficient to add significantly to their stellar masses in a Hubble time. In order to better characterize the physical mechanism or mechanisms that lead to a lack of star formation in many (primarily spheroid-dominated) galaxies at the present day, I will discuss: i) observations of the evolution of the non star-forming galaxy population from $z=2.2$ to the present day, a time span of 10 Gyr, and ii) the evolution of the properties of the non star-forming galaxy population with cosmic time. I will emphasize the importance of galaxy mergers in setting the properties of the non star-forming galaxy population, and discuss briefly constraints on the physical mechanisms by which star formation is quenched in galaxies as they join the red sequence.