

T13a Spectroscopically confirmed quiescent galaxies in the Spiderweb protocluster at $z=2.16$

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Massive quiescent galaxies in the local galaxy cluster are thought to have formed earlier than the average galaxies. To investigate when and how they formed, we need to look at young, forming protoclusters at high redshifts. However, spectroscopically confirming high redshift quiescent galaxies is a challenging task. We report the HST WFC3 G141 grism slitless spectroscopy observation of the core region of the Spiderweb protocluster at $z = 2.16$, with the main goal of spectroscopically identifying quiescent galaxies in the protocluster without the need of pre-selection. We analyzed the spectra of all objects in a $\sim 2 \times 2$ arcmin² field of view and identified 40 protocluster members, recovering 19 previously identified H α -emitters in addition to revealing 21 new members. The spectra allowed us to identify 11 galaxies with quiescent spectra. Three galaxies with quiescent spectra are possibly still star-forming according to SED fitting, indicating a possible left-over or dust-obscured star formation. We estimate a quiescent fraction of $\sim 50\%$ for $M_\star > 10^{11} M_\odot$. About half of the quiescent galaxies possibly host AGN, hinting at AGN's key role in quenching galaxies in the protocluster environment. These quiescent galaxies have relatively more compact and concentrated light profiles than the star-forming members, but they are not yet as bulge-dominated as local ellipticals. These results are consistent with previous studies that indicate the Spiderweb protocluster is in the maturing stage, with a red sequence that has begun forming.