The evolution of passive galaxies through cosmic time

PARTICIPANTS: Paola Santini (PI), Marco Castellano, Nicola Menci, Emiliano Merlin

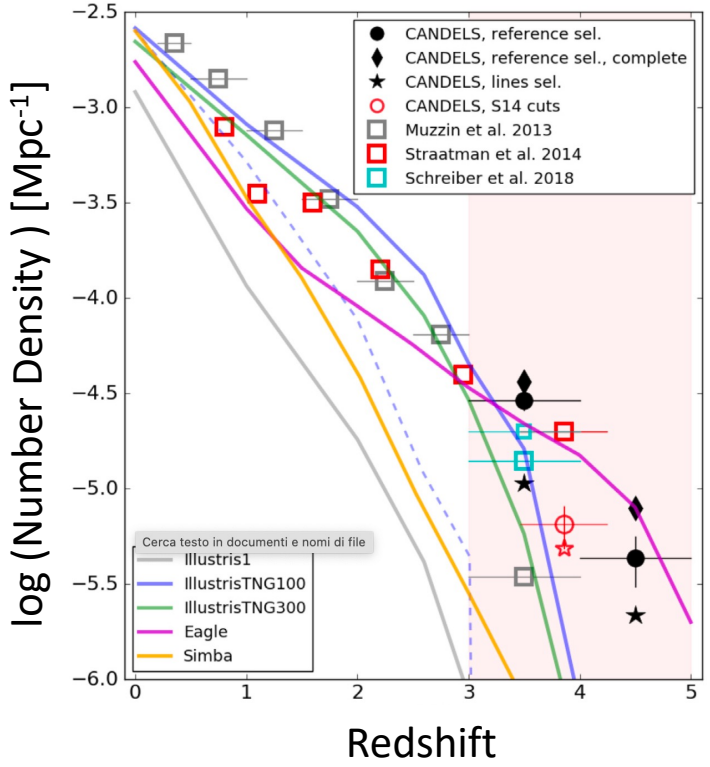
SCHEDA: highzgal

Scientific motivation: Passive galaxies are key to understanding galaxy evolution and assessing the robustness of the concordance cosmological scenario. For the first time, JWST opens to the possibility of investigating their physical properties and quenching mechanisms at z>3.

Goals: *a)* Search of the earliest (z>5) passive candidates; *b)* Investigation of their physical properties and quenching mechanisms; *c)* Statistical analysis of their mass growth; *d)* Theoretical insight on the evolution of passive galaxies.

Deliverables: Release of positions and rest-frame properties of z>3 candidates and of the parameters describing their statistical evolution (MF); presentation of the results at several international conferences; publication of 2-4 peer-reviewed papers.

Total budget: 17500 euro, covering travels and HW.



Significant discrepancies exist in the observed and predicted number density of passive galaxies through cosmic time (Merlin+19).

Main results:

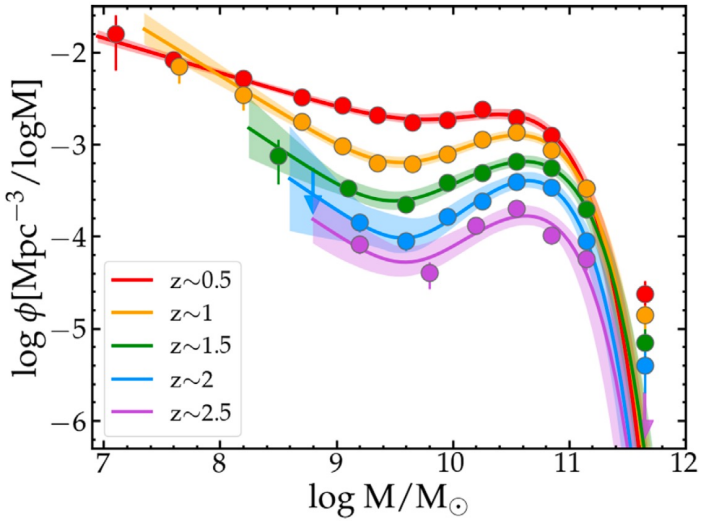
- evolution of the mass function (MF) of passive galaxies at z<=2.5;
- found a variety of physical conditions and star formation histories in z=7-12 galaxies;
- from clustering analysis, found no evolution in the dark matter halos of passive galaxies during the past 12.5 Gyr.

On-going:

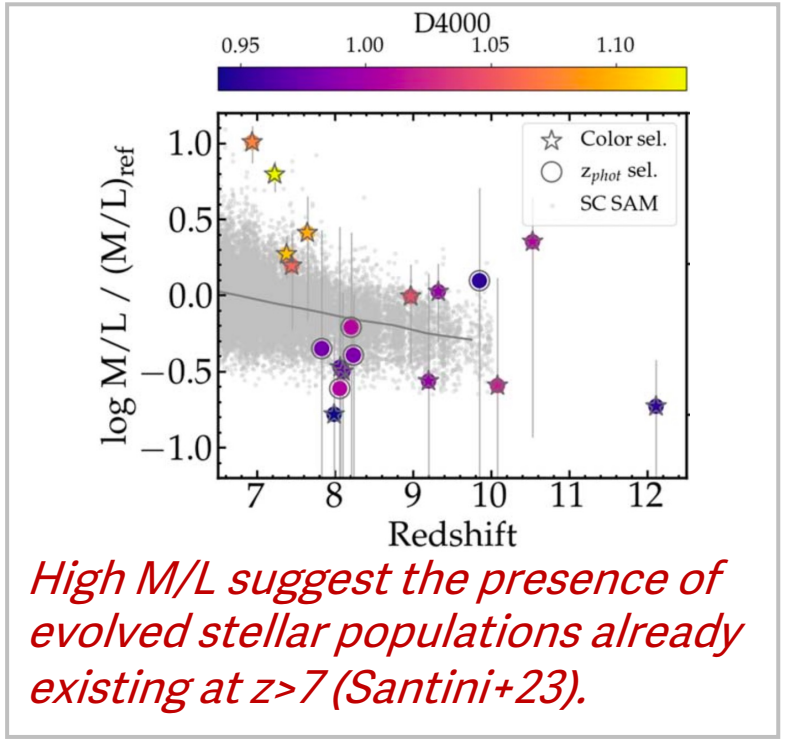
- detection of passive candidates up to z~10;
- spectrophotometric analysis of passive candidates at z=3-5.

Scientific output: 48 peer-reviewed papers (2 as first author). Papers most focused on the grant's goals: Santini+22,+23, Marchesini+23, Magliocchetti+23, Lovell+23, Long+23.

Total expenses so far: ~7500 euro (travels to 5 international and 1 national conferences + HW to support research activity). Travels have allowed dissemination of the results and fostered collaborations for JWST data exploitation.



First detection of the upturn in the MF of passive galaxies at z=>2 (Santini+22).



High M/L suggest the presence of evolved stellar populations already existing at z>7 (Santini+23).