



Red nuggets - hunting for untouched survivors from the early Universe

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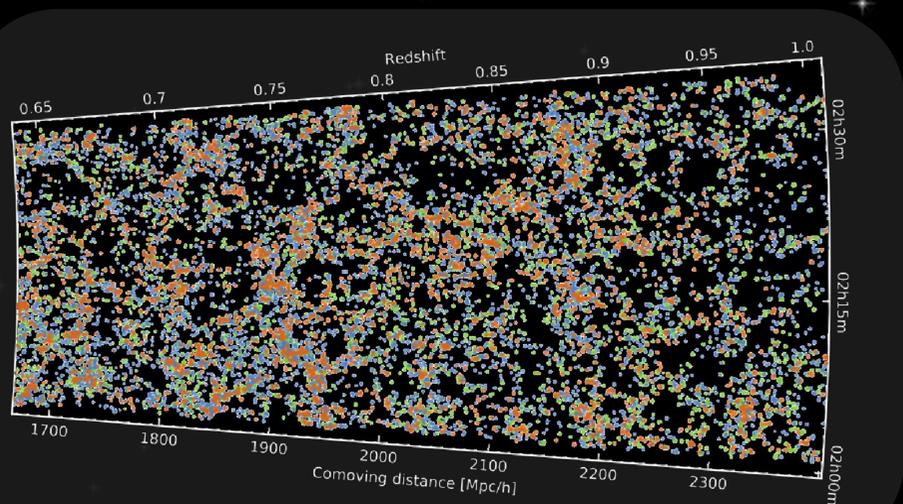
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About a decade ago, astronomers discovered a very rare population of compact massive and passive galaxies - red nuggets, which evolve unaltered in the life of the Universe, allowing us to have an insight into the primordial Universe. Until now, the biggest sample at redshift $z < 0.5$ is less than 100 objects [1]. To explain the main properties of those rare objects, it is necessary to find some examples also in the more distant Universe.

DATA: VIMOS Public Extragalactic Redshift Survey - VIPERS

- ~90 000 Spectroscopically measured galaxies
- Redshift range: 0.4 - 1.2
- Wavelength range: 4500 - 9500 Å
- Total area: 23.5 deg²



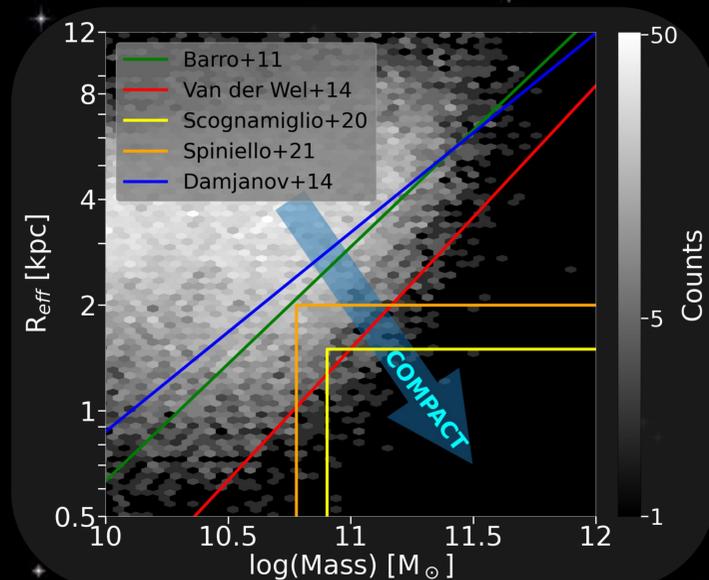
Galaxy distribution at $0.45 < z < 1.1$ in VIPERS field W1. Each galaxy is represented by a filled circle of size proportional to its B-band luminosity and colored according to its rest-frame U-V color [2].

Main question

Are there any red nuggets in VIPERS?

Compactness

The plot below shows different definitions of compact galaxies. Due to the plurality of interpretations, it is often difficult to compare results.

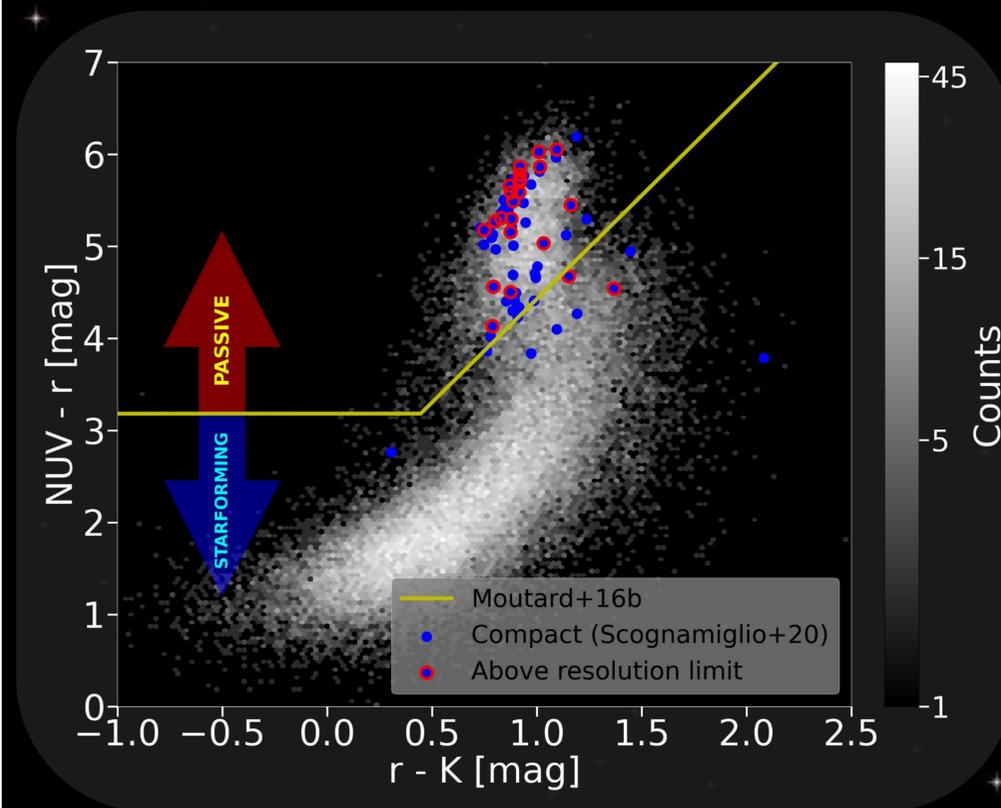


Conclusions

- We Found 21 objects which are considered as red nuggets. It is the largest known sample at redshift above 0.5.
- The next step is to analyze the physical properties of those unique objects.
- There is a discrepancy in the literature in the definition of compactness.

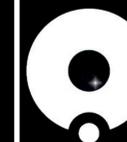
Results

We found 86 sources, which meet the criteria of compact galaxies [3], but only 23 of them have effective radius larger than the VIPERS resolution limit. Among them, we found 21 objects considered as passive - red nuggets [4].



References

- [1] Spiniello et. al 2021, accepted for A&A
- [2] Guzzo et. al 2014, A&A, 566, 21
- [3] Scognamiglio et. al 2020, ApJ, 893, 4
- [4] Lisiecki et. al, in preparation



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