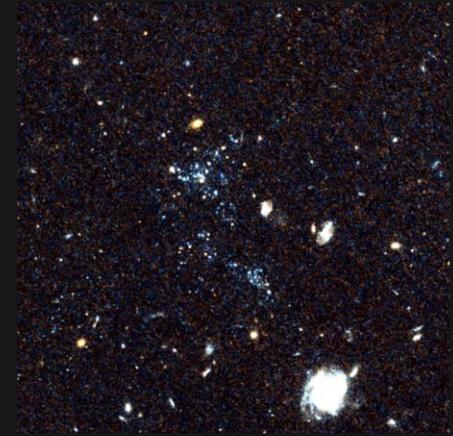
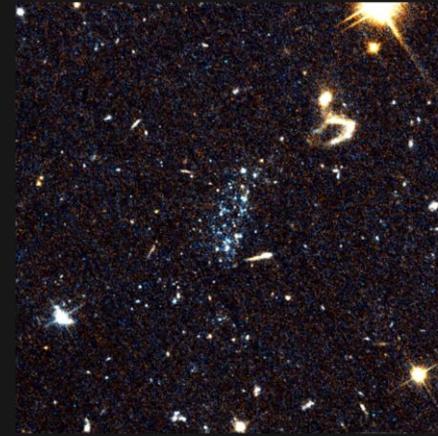
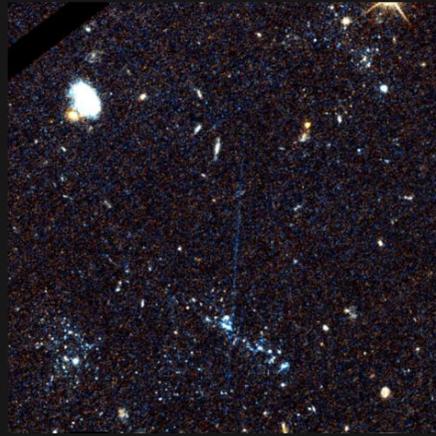
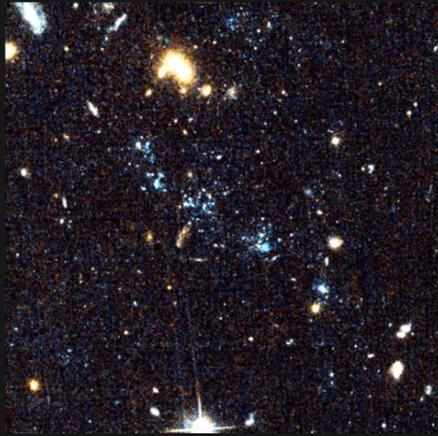
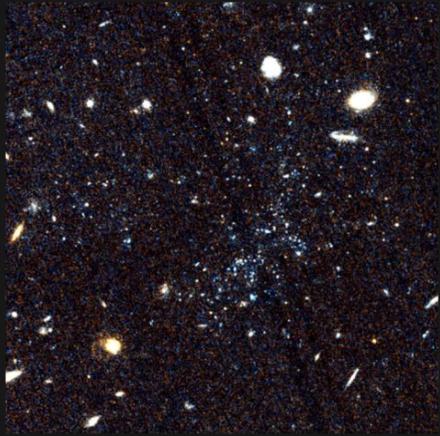


Young, Blue, and Isolated Stellar Systems in the Virgo Cluster



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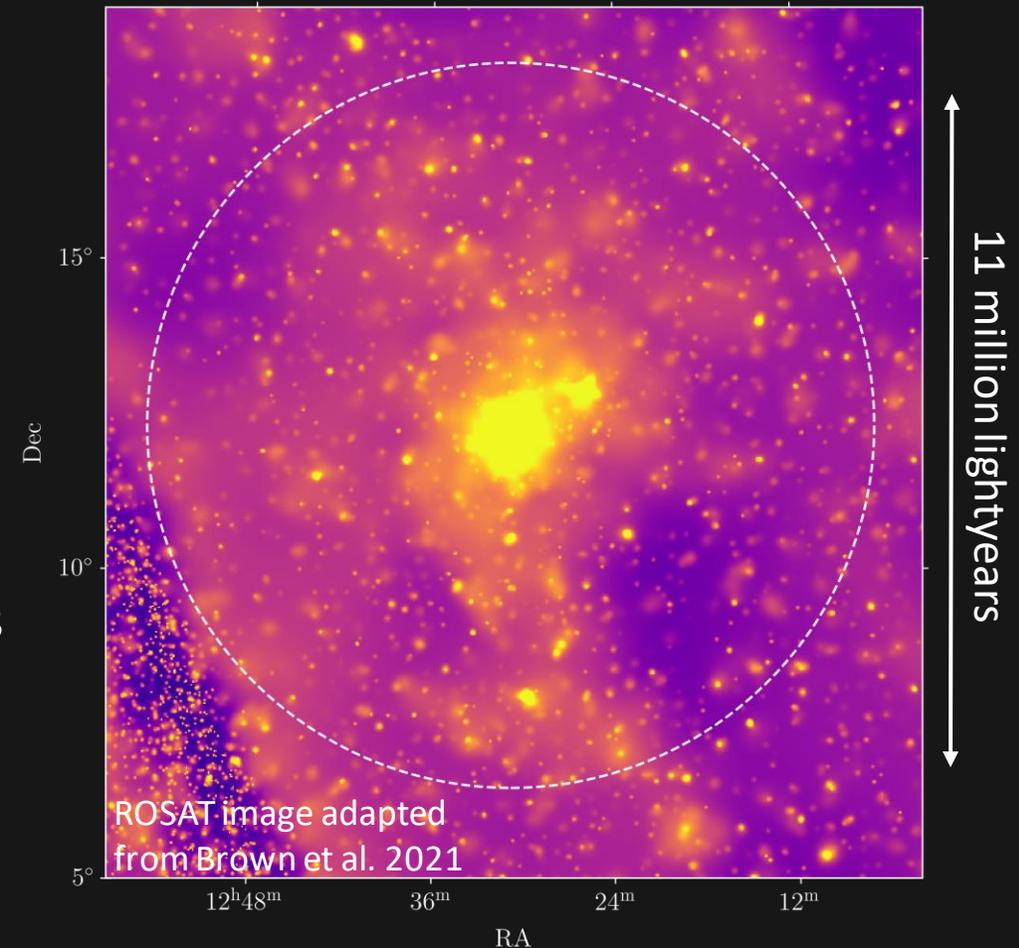
Collaborators:

David Sand
Michele Bellazzini
Kristine Spekkens
and many more

The Virgo galaxy cluster is a hostile environment

- Virgo is the closest galaxy cluster to us, at a distance of about 50 million lightyears.
- Galaxy clusters are filled with hot, ionized gas, called the intra-cluster medium (ICM).
- Star-forming galaxies need cold gas to fuel their star formation.
- A galaxy cluster is a very hostile environment for this cold gas.
- Even large galaxies similar to our Milky Way rapidly lose their gas in a cluster.

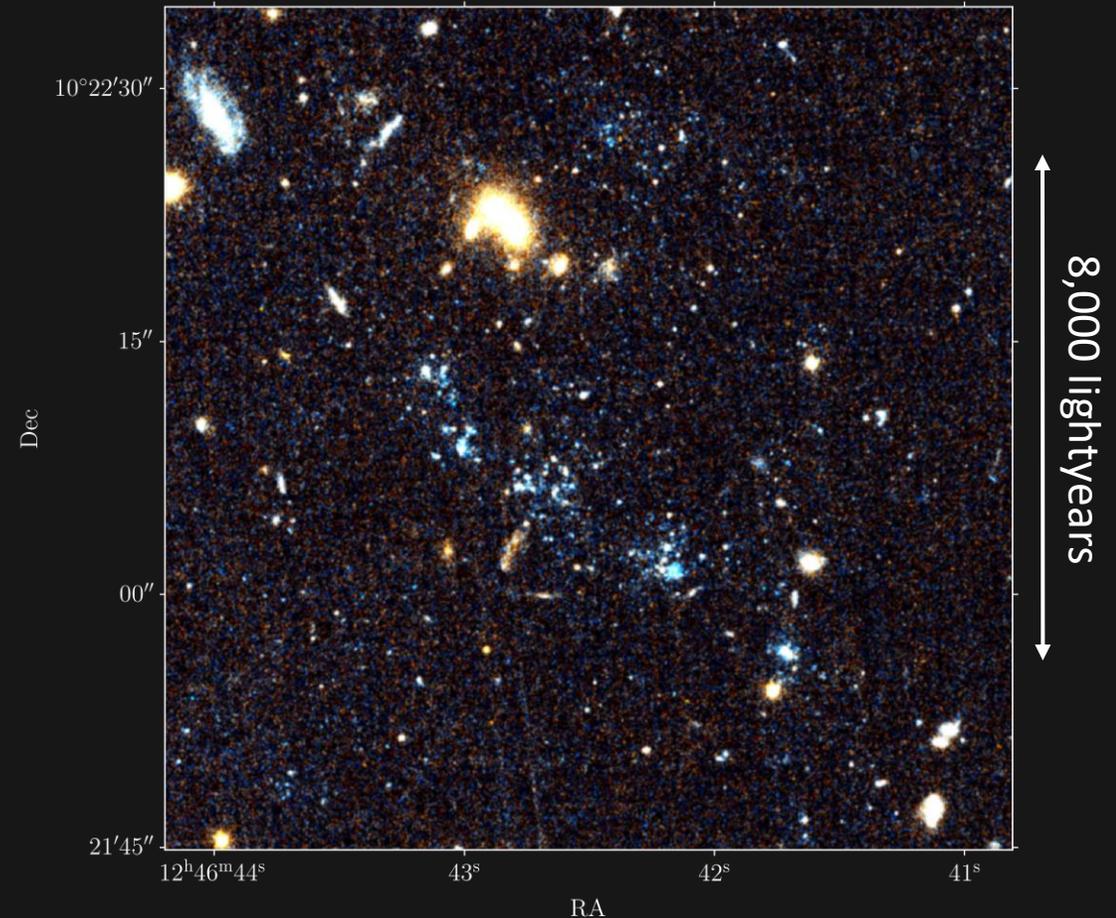
X-ray image of the Virgo cluster



Tiny oases in a desert

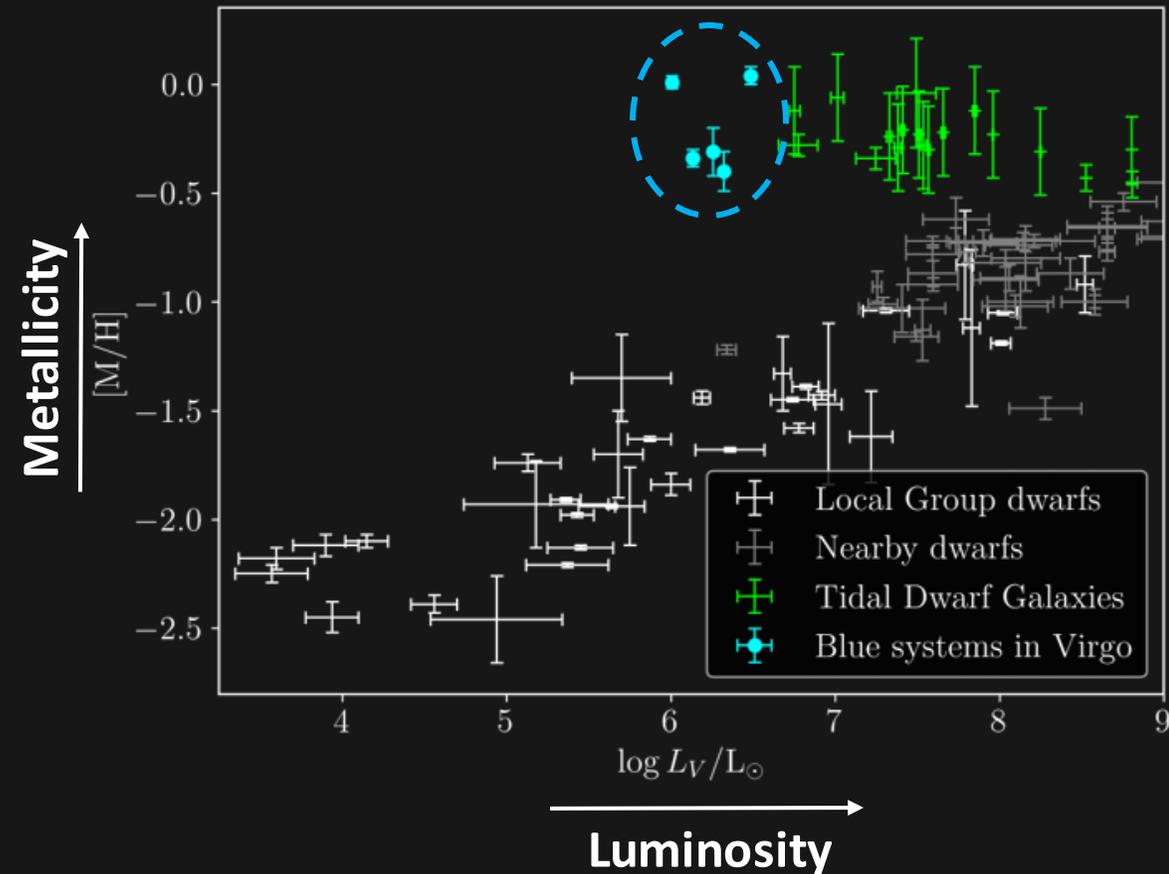
- We have identified 5 irregular, blue, and isolated stellar systems in the Virgo cluster.
- Dominated by young and blue stars.
- A million times less massive than our galaxy.
- We colloquially refer to these objects as "blue blobs."

Hubble Space Telescope image of one blue blob in the Virgo cluster



Formed from pre-enriched gas

- Generally bigger galaxies are richer in heavy elements, that is they are of higher "metallicity."
- These blue stellar systems do not follow this trend.
- This is a telltale sign that they formed from gas stripped from a large galaxy.

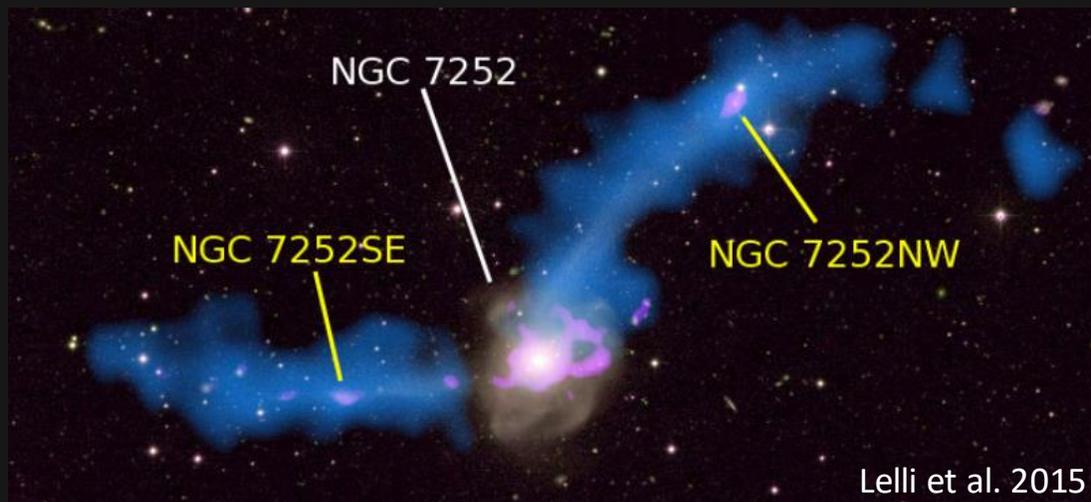


How did they form?

Tidal stripping:

- Interaction of 2 or more galaxies.
- Gravity pulls out gas and stars.
- Gas collapses to form dwarf.

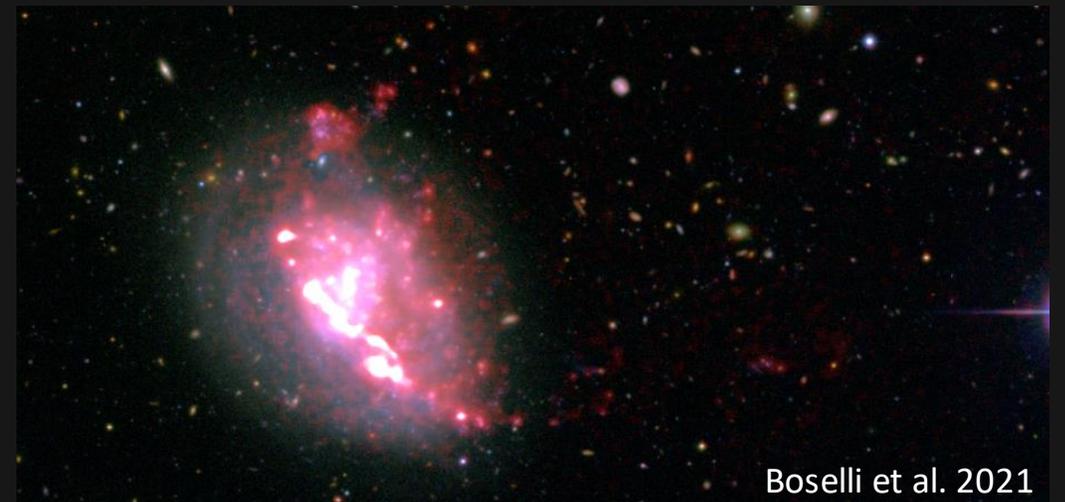
Tidal dwarf galaxies forming in **gas**-rich tidal tails



Ram pressure stripping:

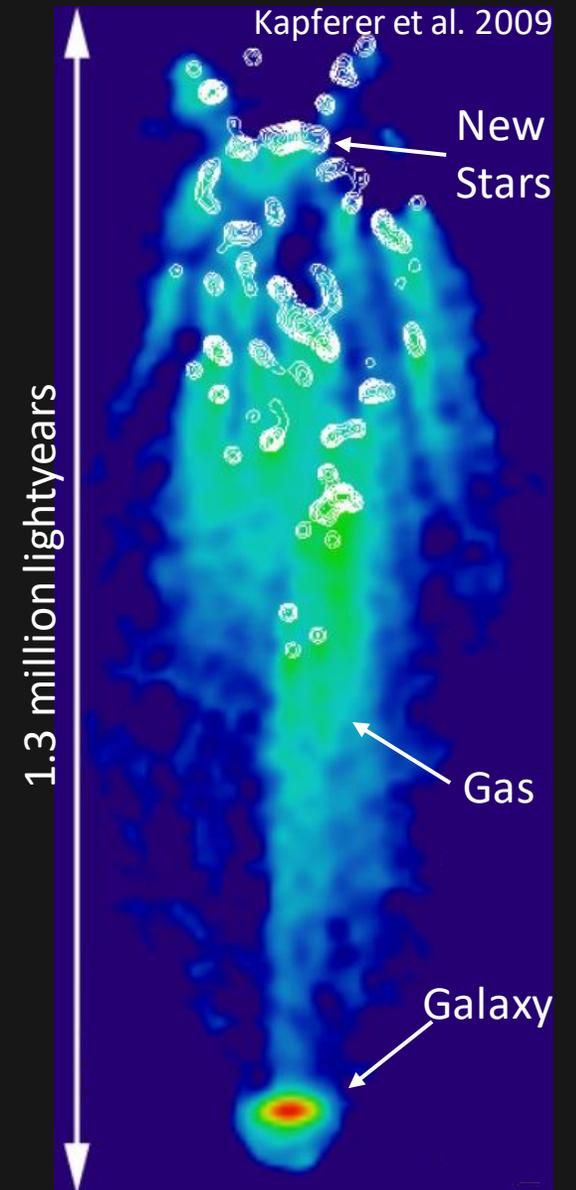
- Galaxy falling into a cluster.
- ICM forces gas out of the galaxy.
- Stars form in the wake.

Ram pressure forcing out **gas** from a galaxy.



How did they become so isolated?

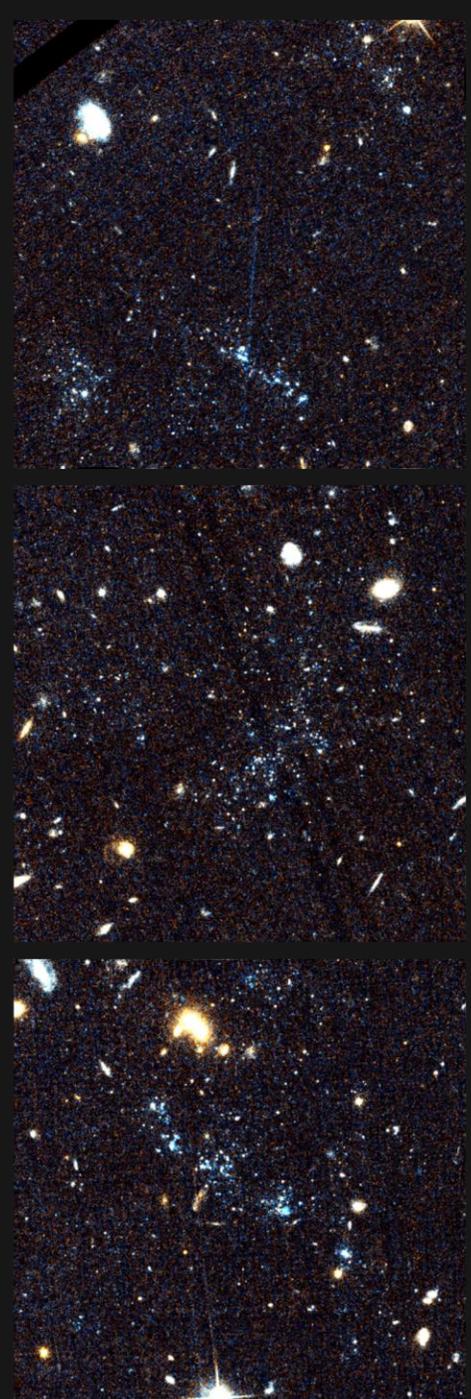
- Tidal dwarf galaxies are typically ejected at <400 km/s.
- They would take billions of years to become isolated.
- Ram pressure stripping can occur at >1000 km/s.
- Isolation is more naturally explained in the ram pressure stripping scenario.



Simulation of ram pressured stripped gas and new stars.

A new class of stellar system

- "Blue blobs" reside in a **galaxy cluster**, but are **isolated** and made up of **young stars**, making them unlike any other known stellar systems.
- Their high **metallicities** indicate that they formed from stripped gas.
- Formation via **ram pressure stripping** is the mechanism that most naturally explains their properties, in particular their isolation.



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