



Callum Bellhouse

Untangling Jellyfish

The hard life of galaxies

- 
1. Why Chile?
 2. The VLT
 3. Space Jellyfish!

- 
- 1. Why Chile?**
 2. The VLT
 3. Space Jellyfish!

Things to consider when
building an observatory:



Best place in Europe: La Palma



For Southern
hemisphere, we have
to look elsewhere!

*The birth of the European
Southern Observatory*



High Altitude



Dry Climate



Dark Skies



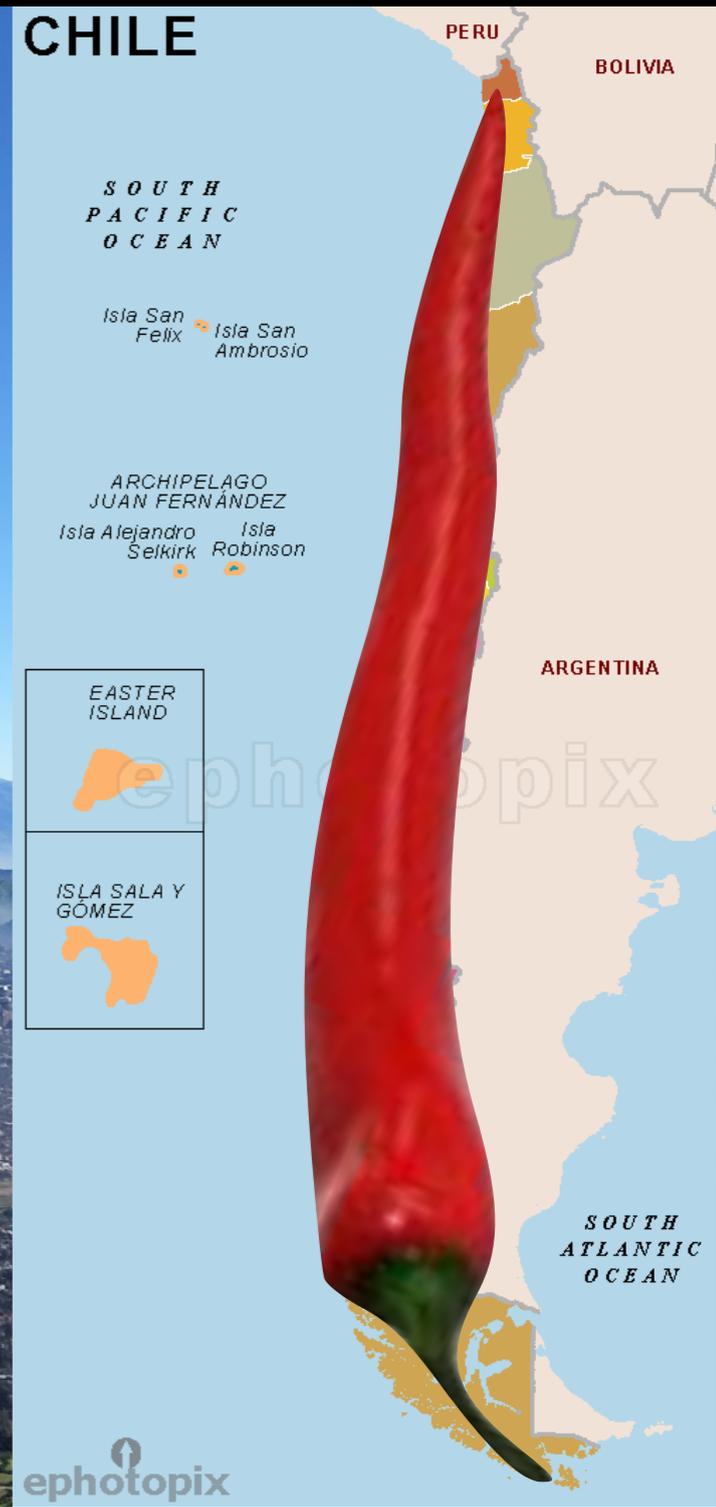
Cloudless Skies!



Image credit: NASA, Hubble, STS-61 Endeavour



Santiago de Chile



Santiago de Chile



Santiago de Chile



Valle de la Luna, Atacama



Altiplanico, Atacama



Valle de Elqui, Northern Chile



Los Andes



Torres del Paine, Patagonia

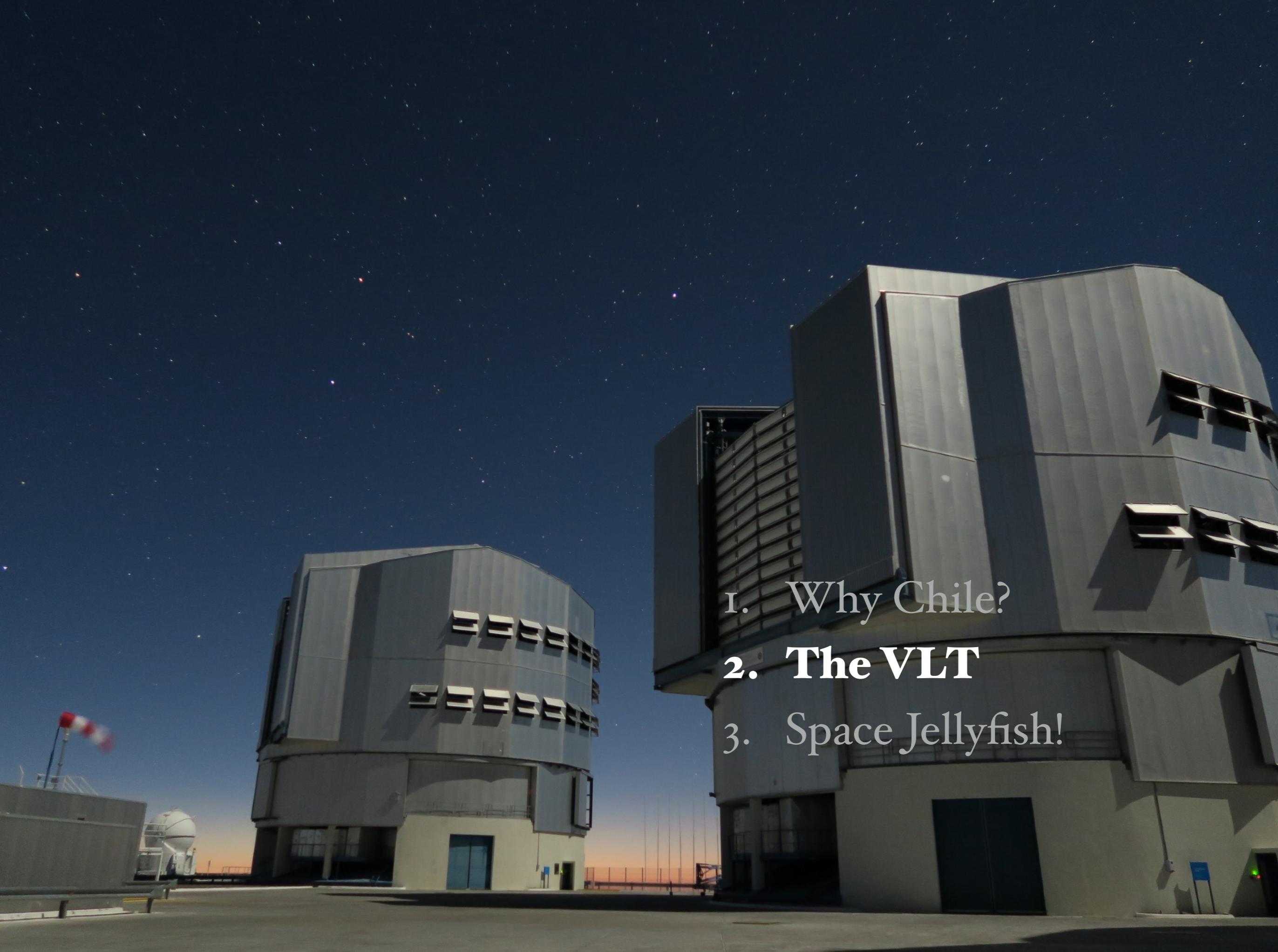


Torres del Paine, Patagonia

ESO HQ, Santiago



Image credit: Julien Girard, 2013

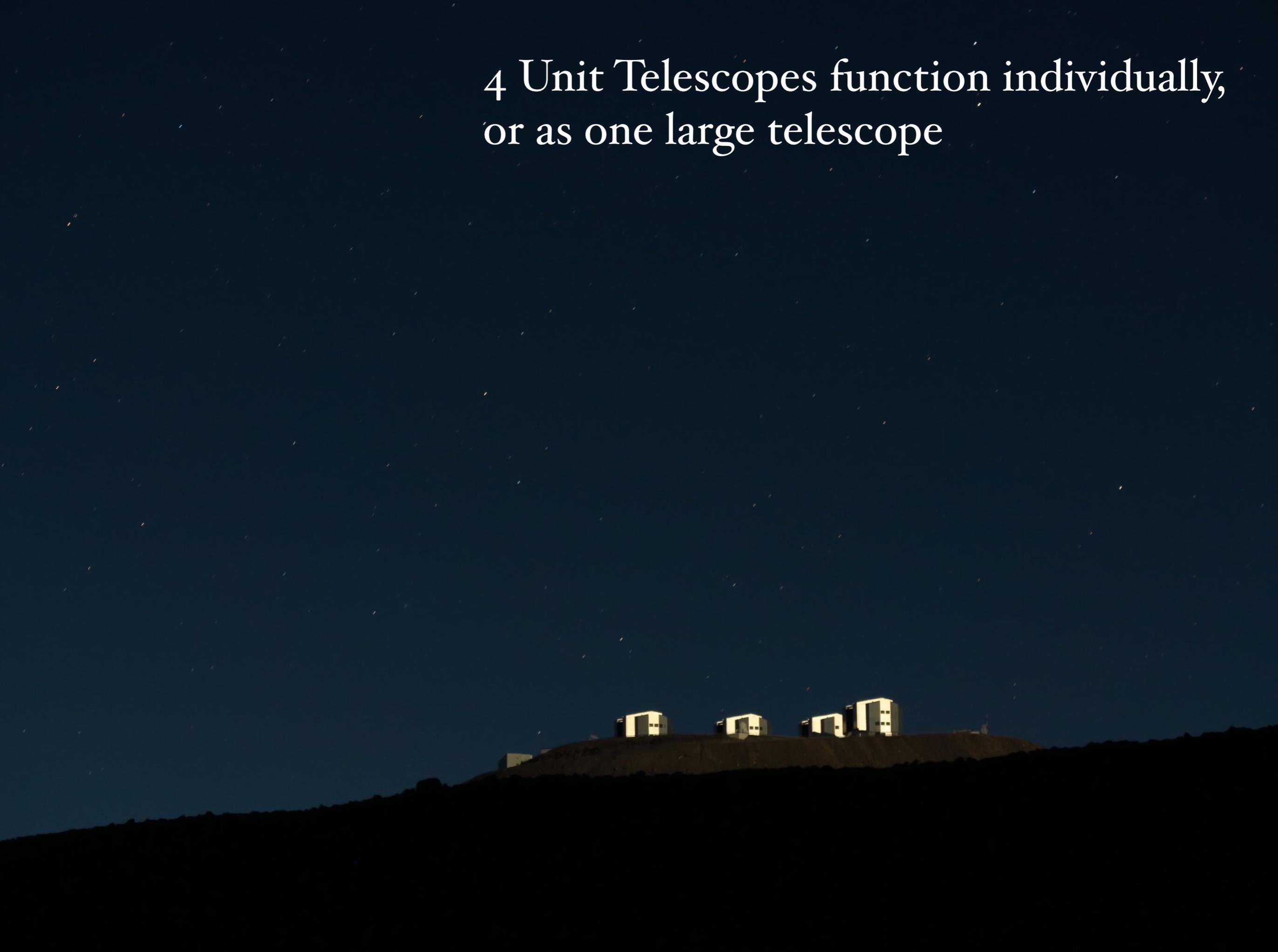
- 
- The image shows two large, modern, cylindrical telescope enclosures at night. The enclosures are made of light-colored panels and have several rows of small, rectangular openings. The sky is dark blue with many stars visible. In the background, there is a red and white striped windsock and a white spherical structure. The ground is a flat, paved area.
1. Why Chile?
 - 2. The VLT**
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ESO and the VLT

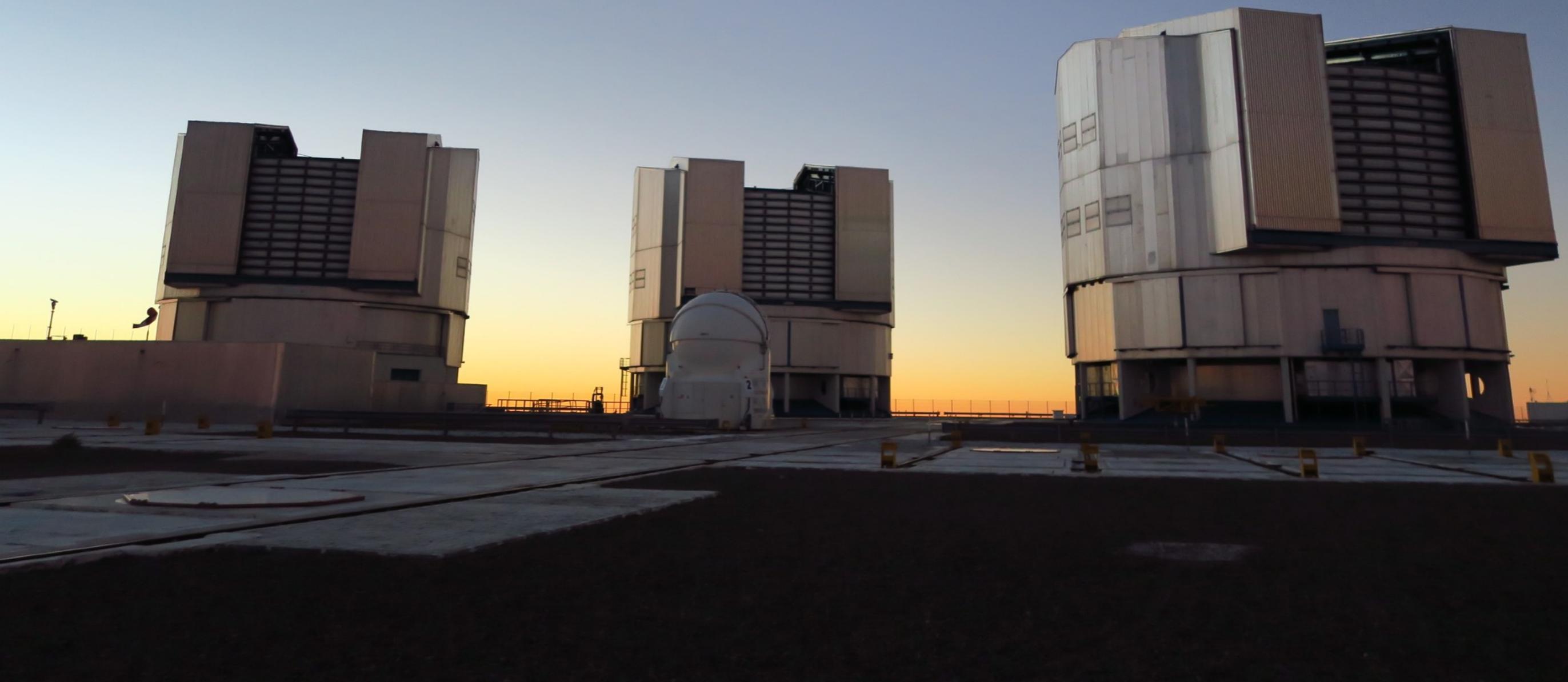
(Very Large Telescope)



4 Unit Telescopes function individually,
or as one large telescope



Each individual UT contains a set of advanced instruments



And all telescopes can work together as
an “interferometer”



What makes the VLT so great?



Technology!

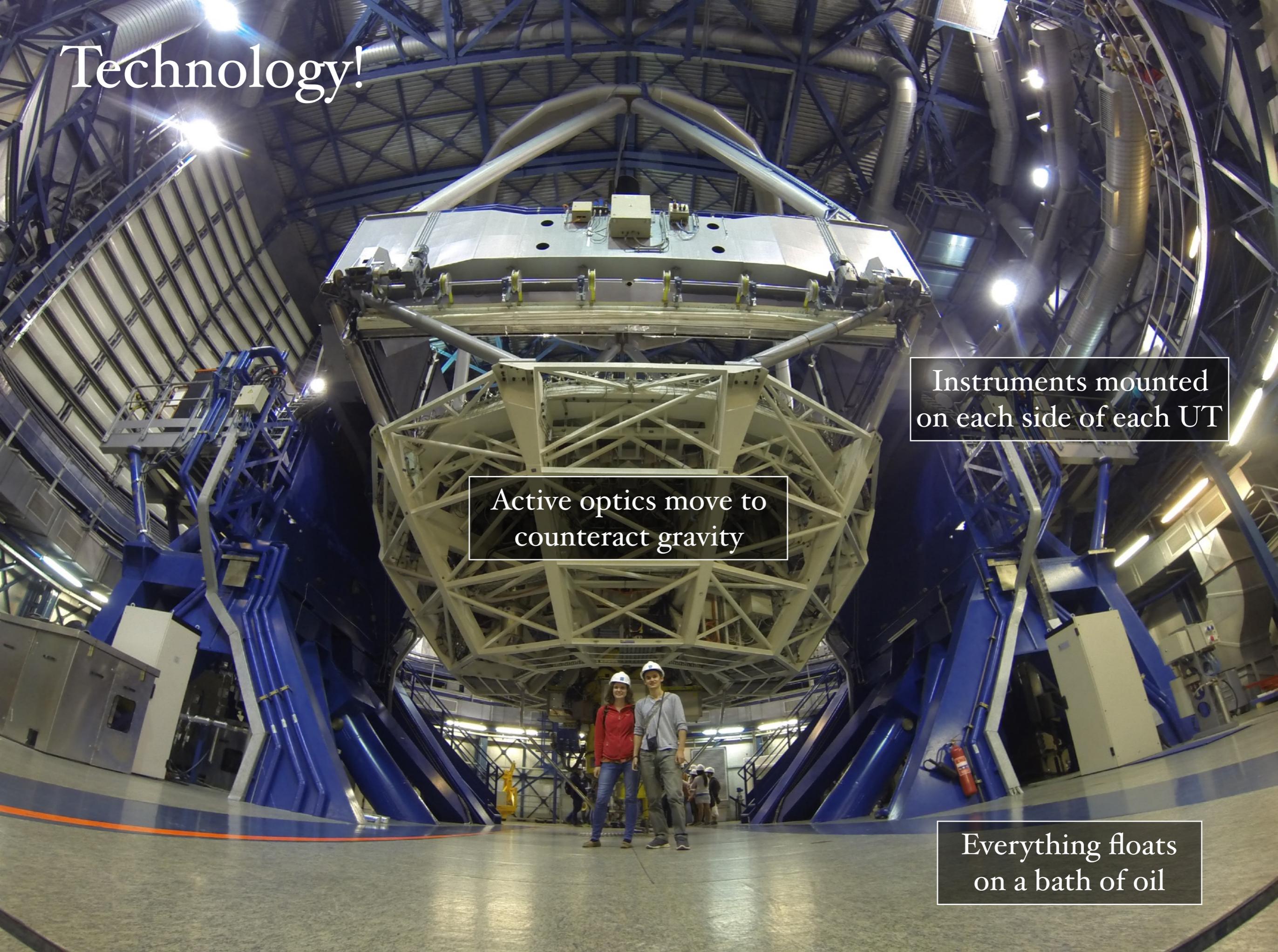


Technology!

Instruments mounted on each side of each UT

Active optics move to counteract gravity

Everything floats on a bath of oil



Technology!

Secondary mirror moves to counteract "seeing"

Lasers fire up into the sky to measure the motion of the atmosphere

Lasers!

Lasers!





EUROPEAN SOUTHERN OBSERVATORY
PARANAL OBSERVATORY



1. Why Chile?

2. The VLT

3. Space Jellyfish!

Two families of galaxies

Elliptical



No dust

Random rotation

No substructure

Spiral



Lots of dust

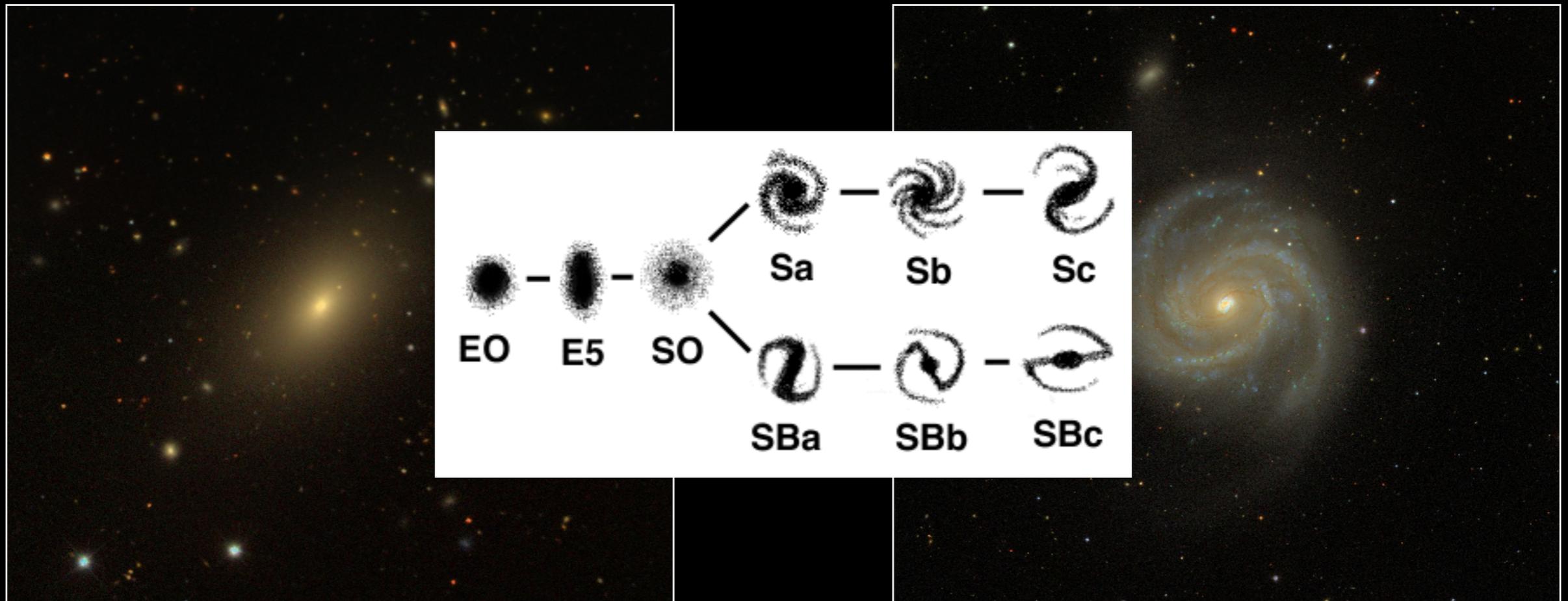
Uniform rotation

Bulge, disk, arms, bars

The Hubble Tuning Fork?

Elliptical

Spiral



No dust

Random rotation

No substructure

Lots of dust

Uniform rotation

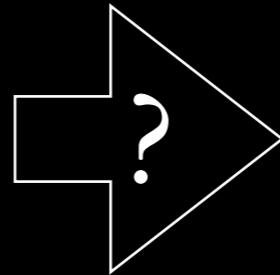
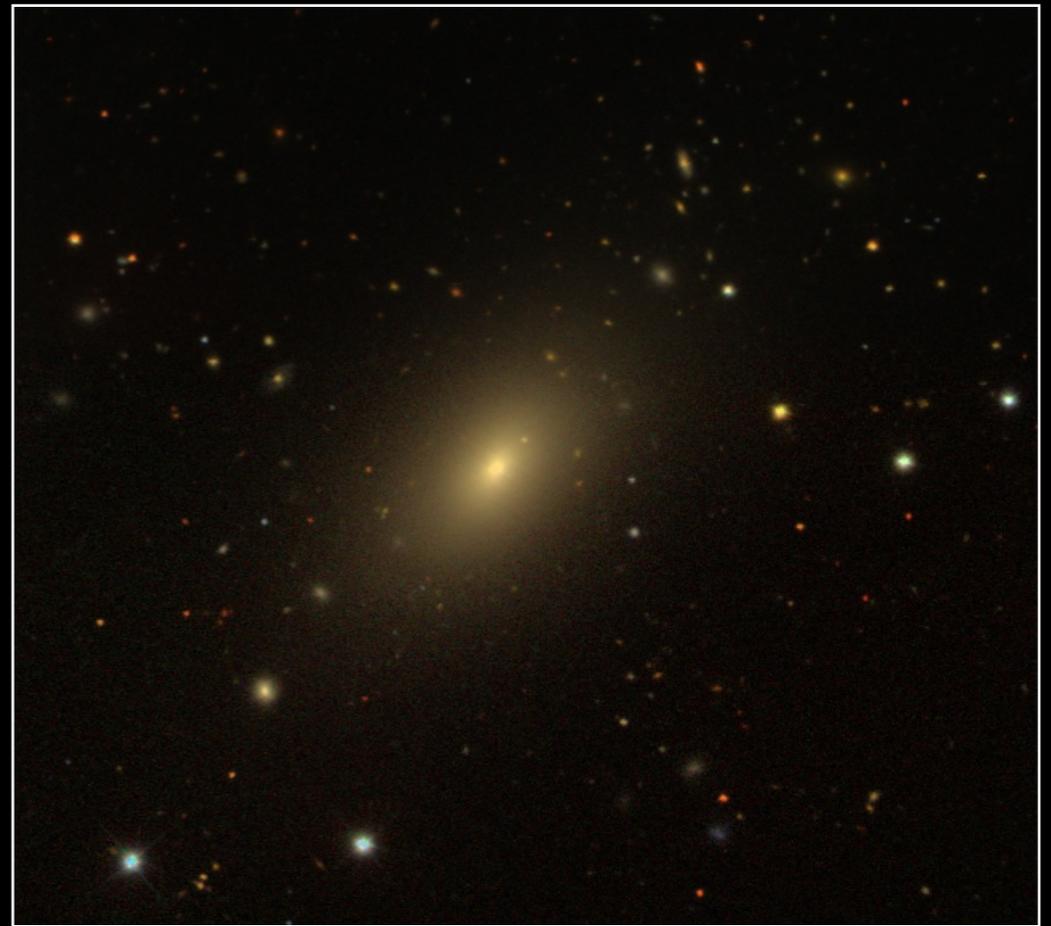
Bulge, disk, arms, bars

In modern models, Spirals *become* ellipticals

Spiral



Elliptical



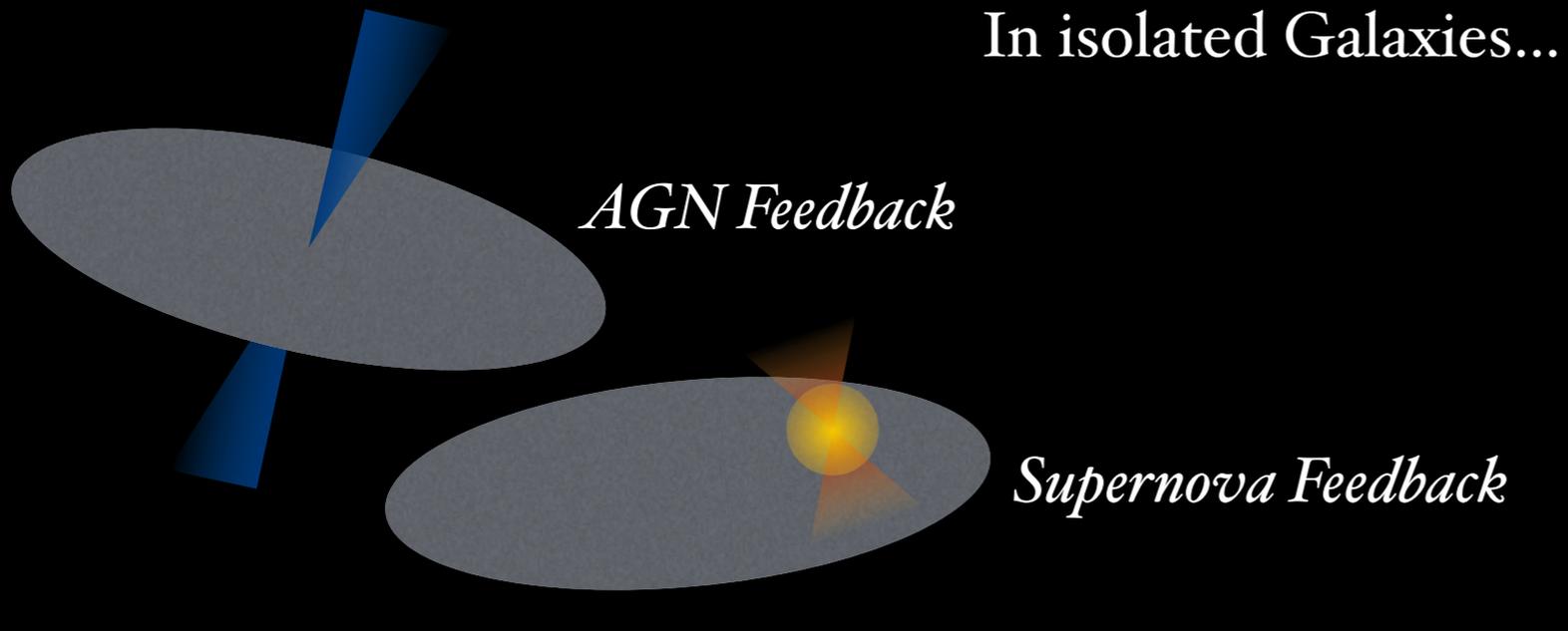
Dust is used/removed

Rotation is disturbed?

Structure is lost

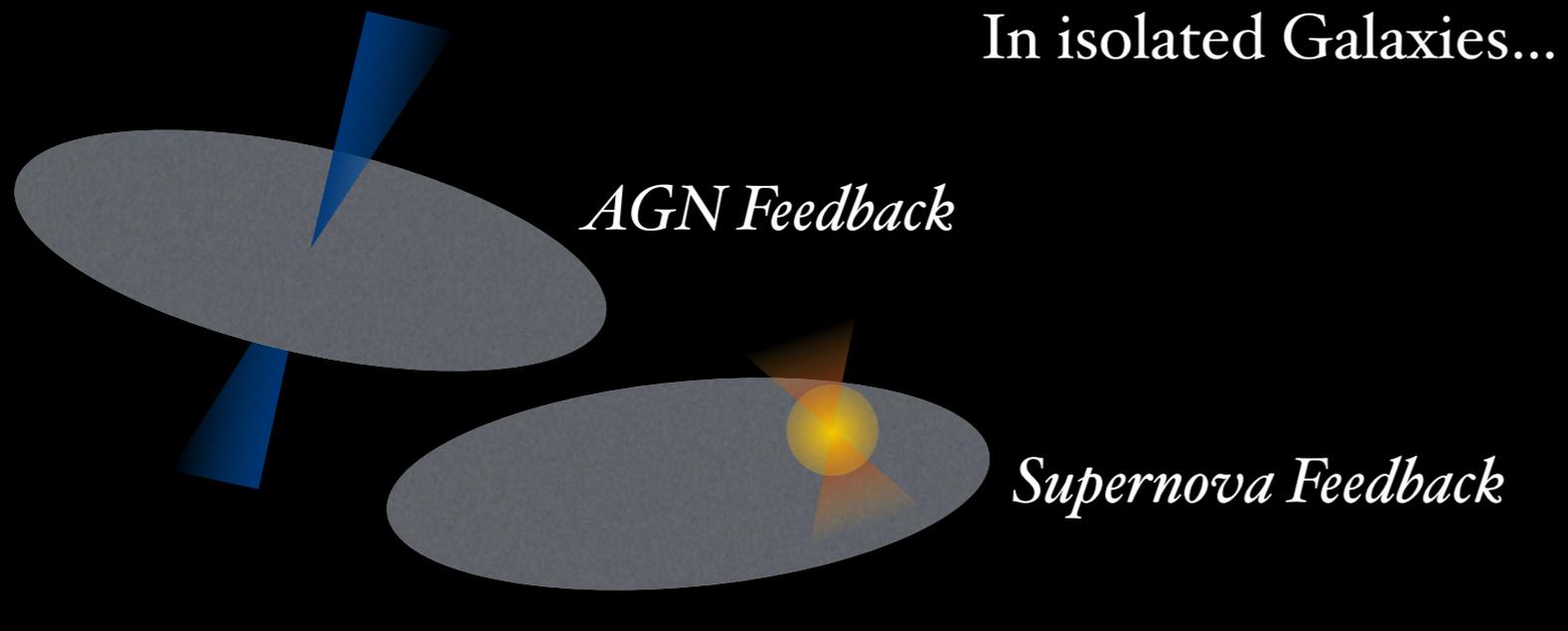
How can we remove the gas?

In isolated Galaxies...

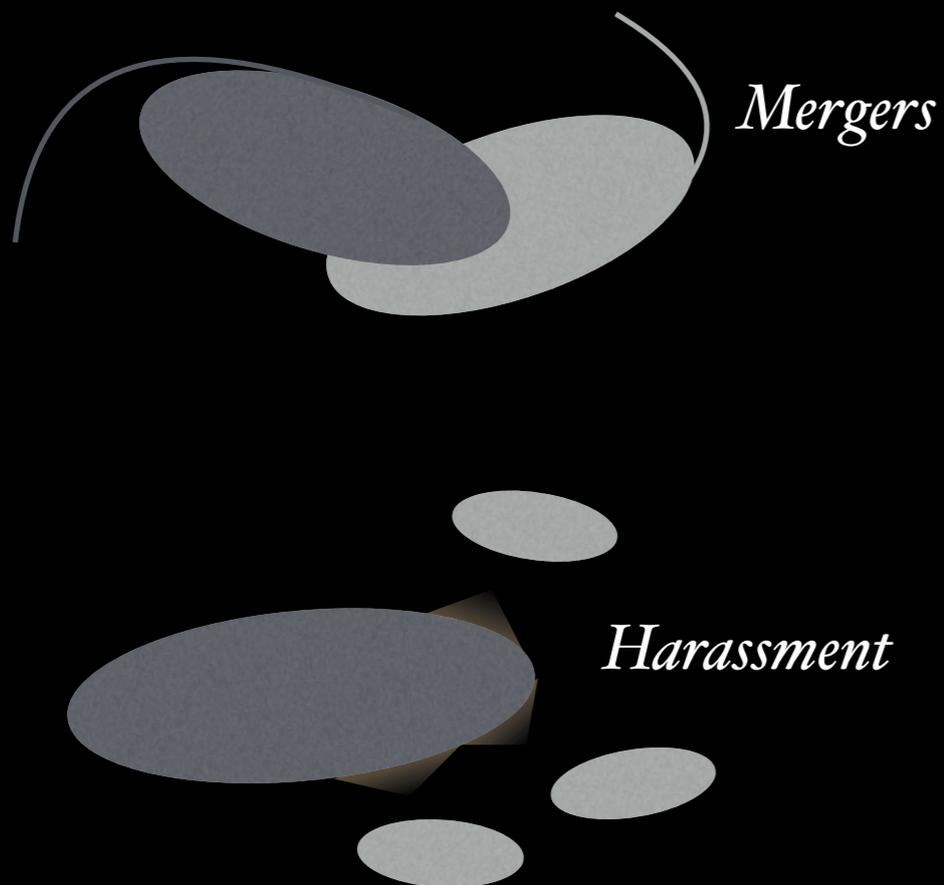


How can the gas be removed?

In isolated Galaxies...

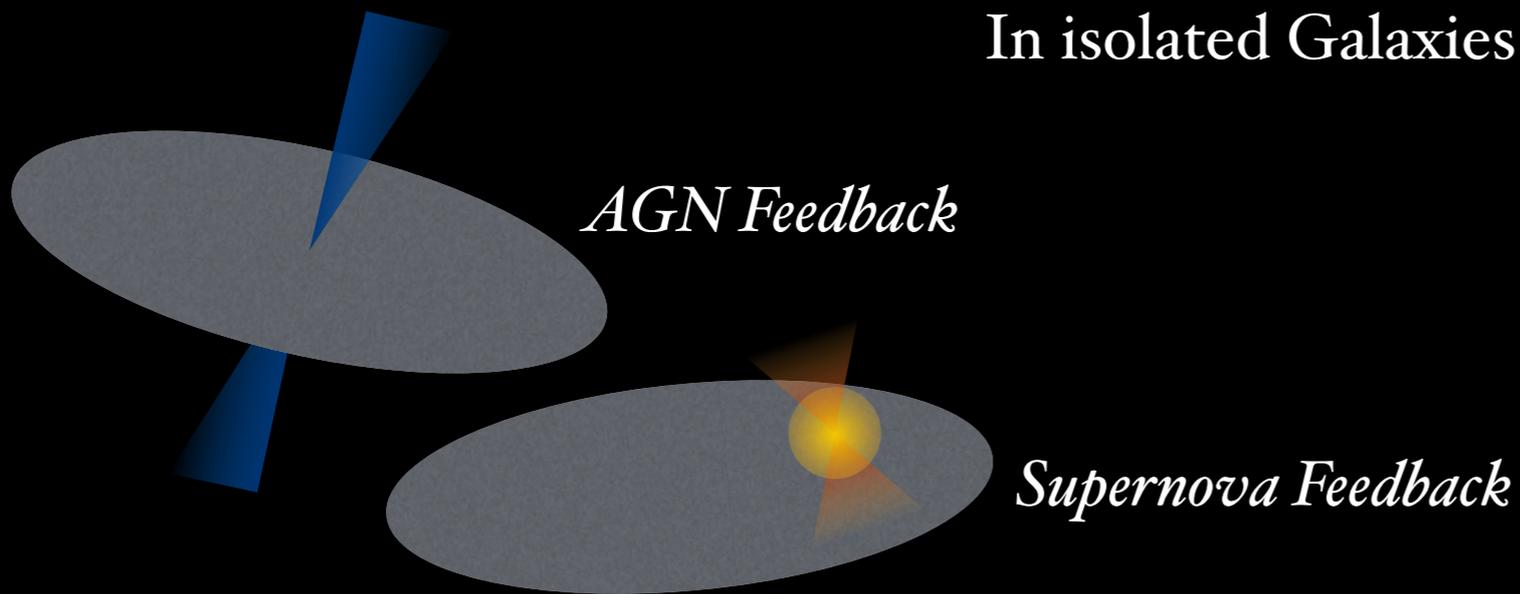


In Galaxy Clusters...

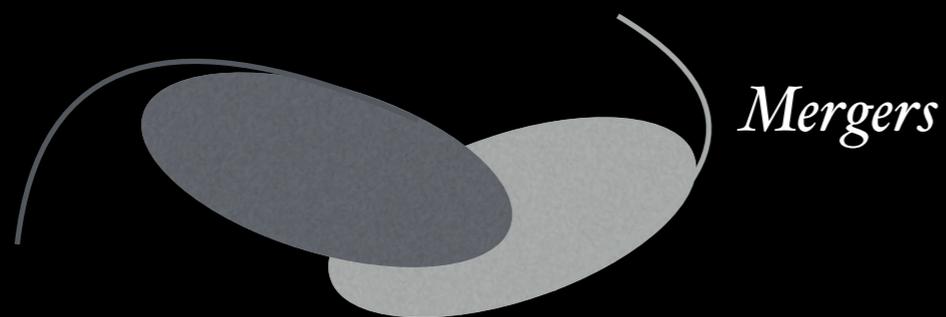


How can the gas be removed?

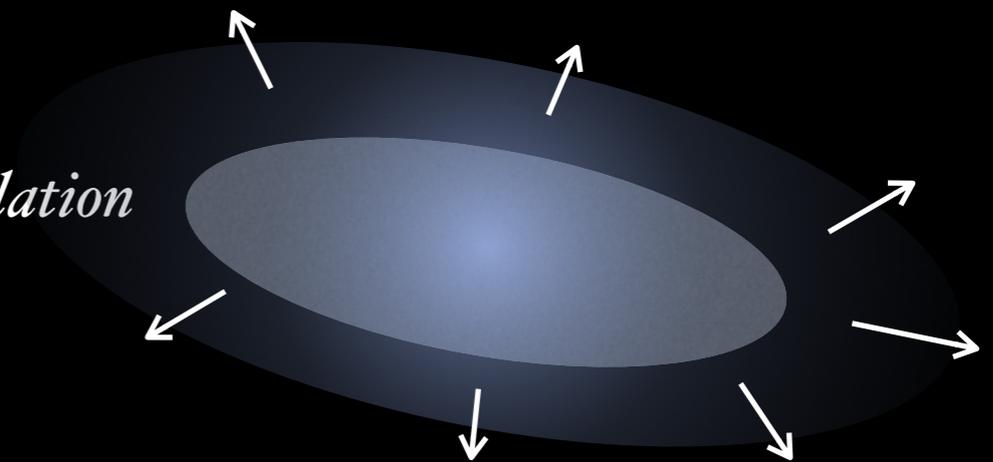
In isolated Galaxies...



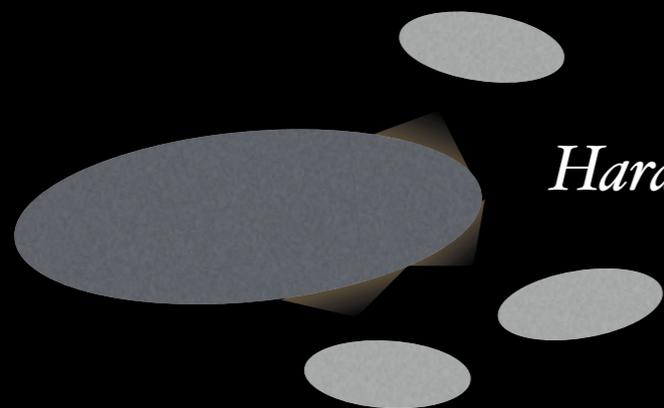
In Galaxy Clusters...



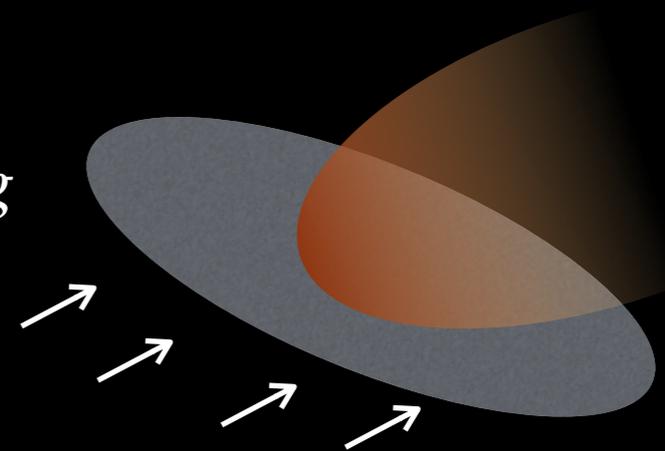
Strangulation



Harassment

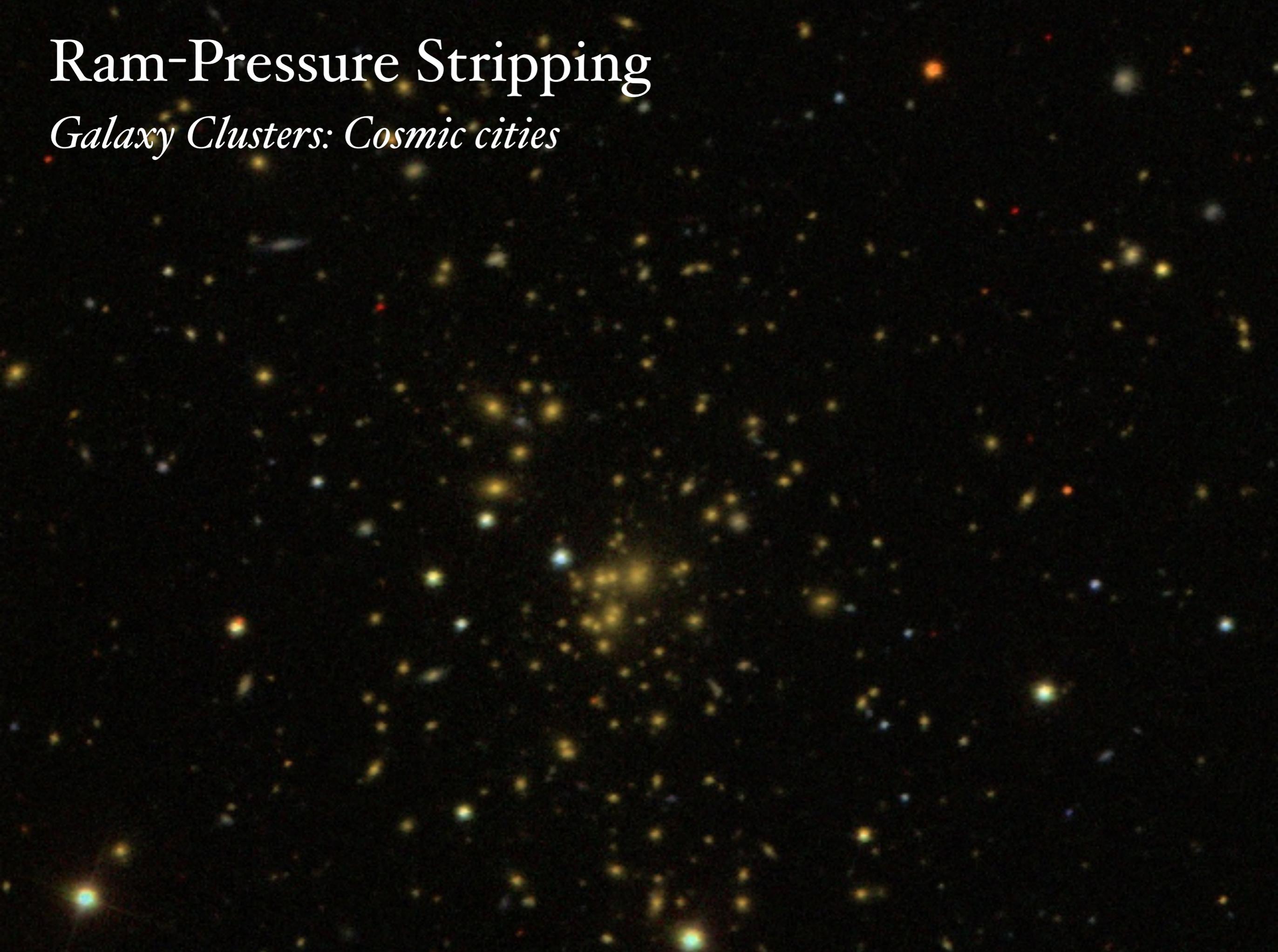


Ram-Pressure Stripping



Ram-Pressure Stripping

Galaxy Clusters: Cosmic cities



Ram-Pressure Stripping

A field of stars of various colors (yellow, orange, red, blue, green) scattered across a dark background. The text 'Galaxies' is overlaid in the center.

Galaxies

Ram-Pressure Stripping

The image shows a vast field of stars against a dark background. The stars are distributed across the frame, with a higher density in the center. The central region has a distinct blue tint, while the stars in the periphery are more yellow and white. This visual representation likely depicts the process of ram-pressure stripping, where the central region of a galaxy cluster remains intact while the outer regions are stripped away.

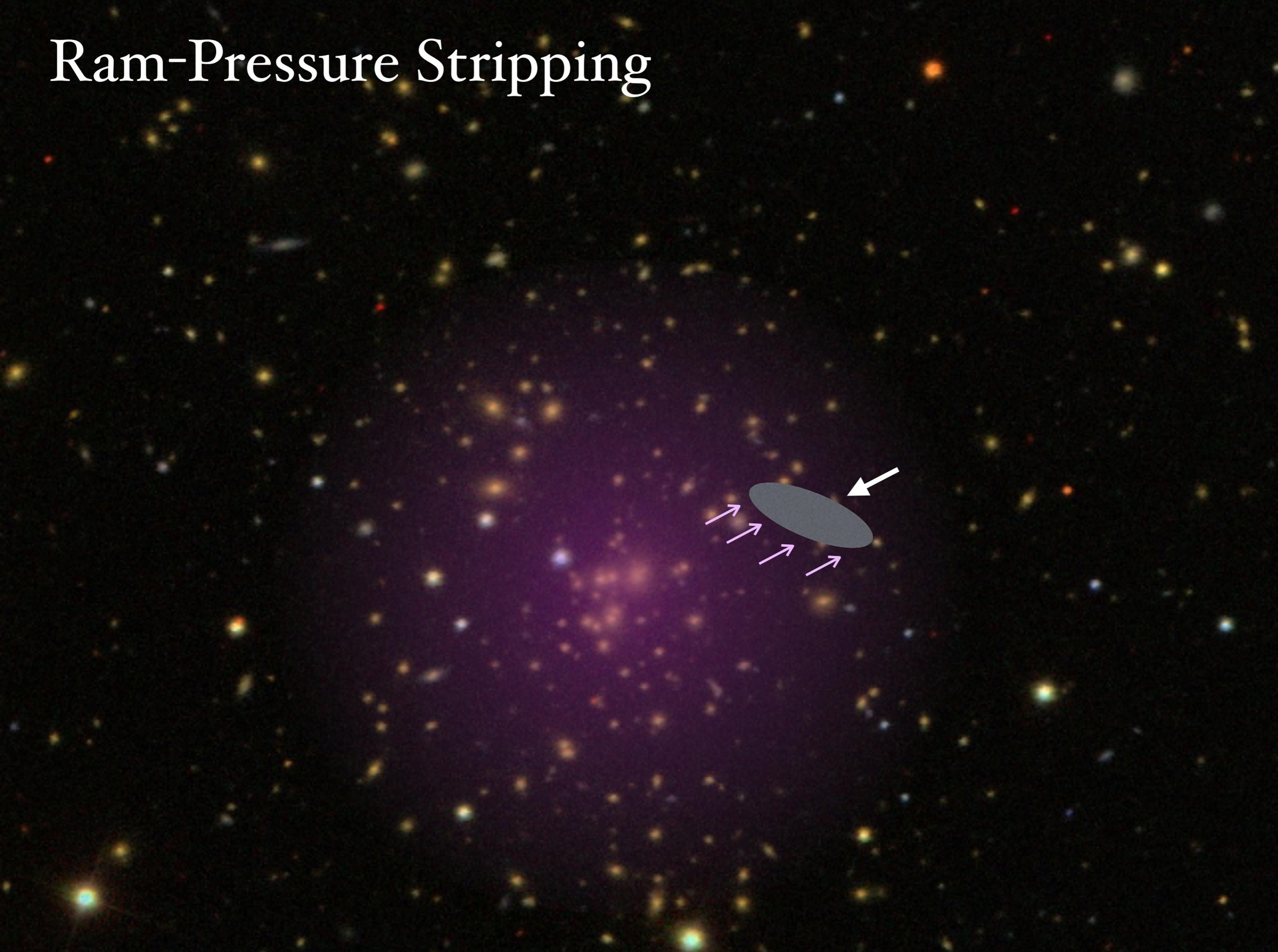
Dark Matter
(Gravitational Lensing)

Ram-Pressure Stripping

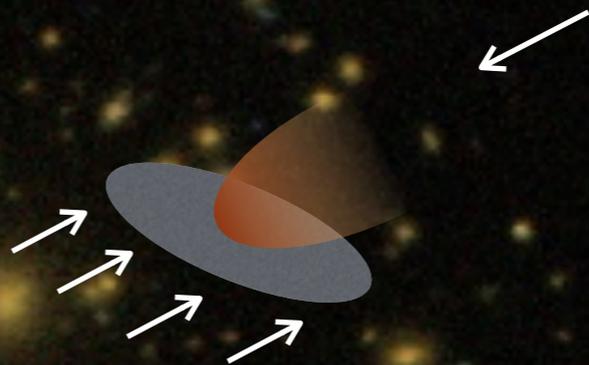


Hot Gas
(X-Ray)

Ram-Pressure Stripping



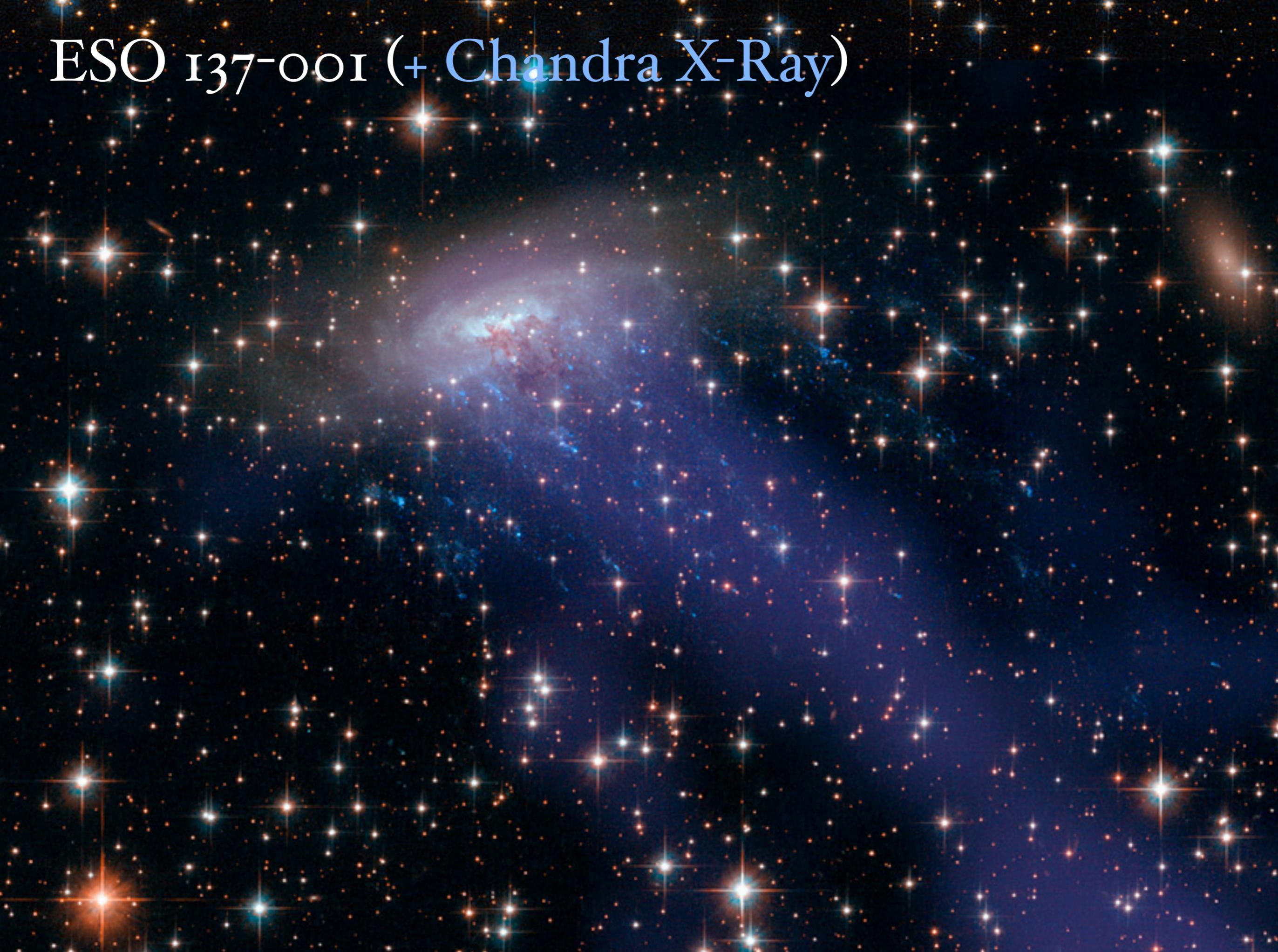
Ram-Pressure Stripping



ESO 137-001



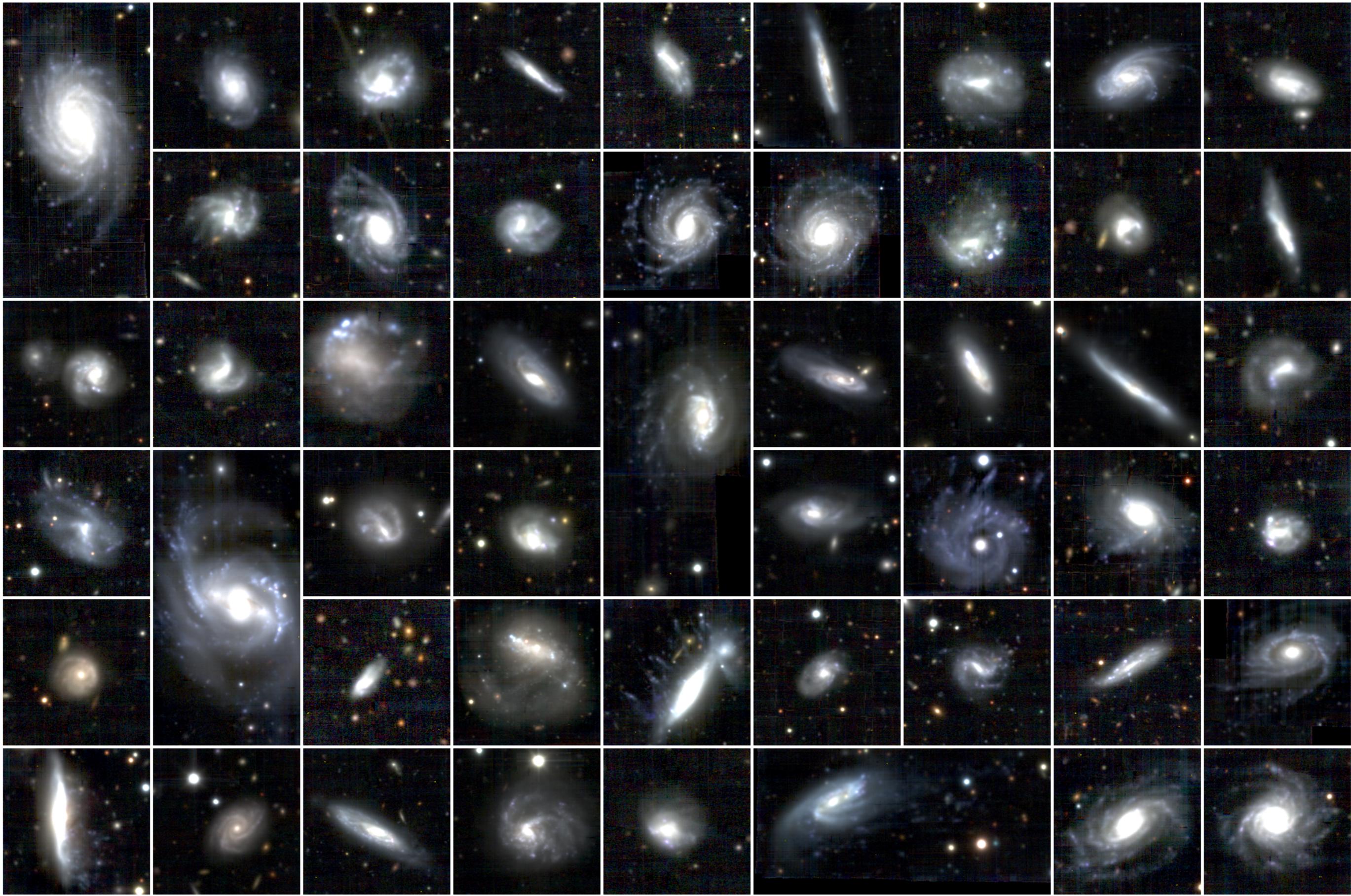
ESO 137-001 (+ Chandra X-Ray)



GASP Survey of Jellyfish Galaxies

GASP - GAs Stripping Phenomena in galaxies with MUSE

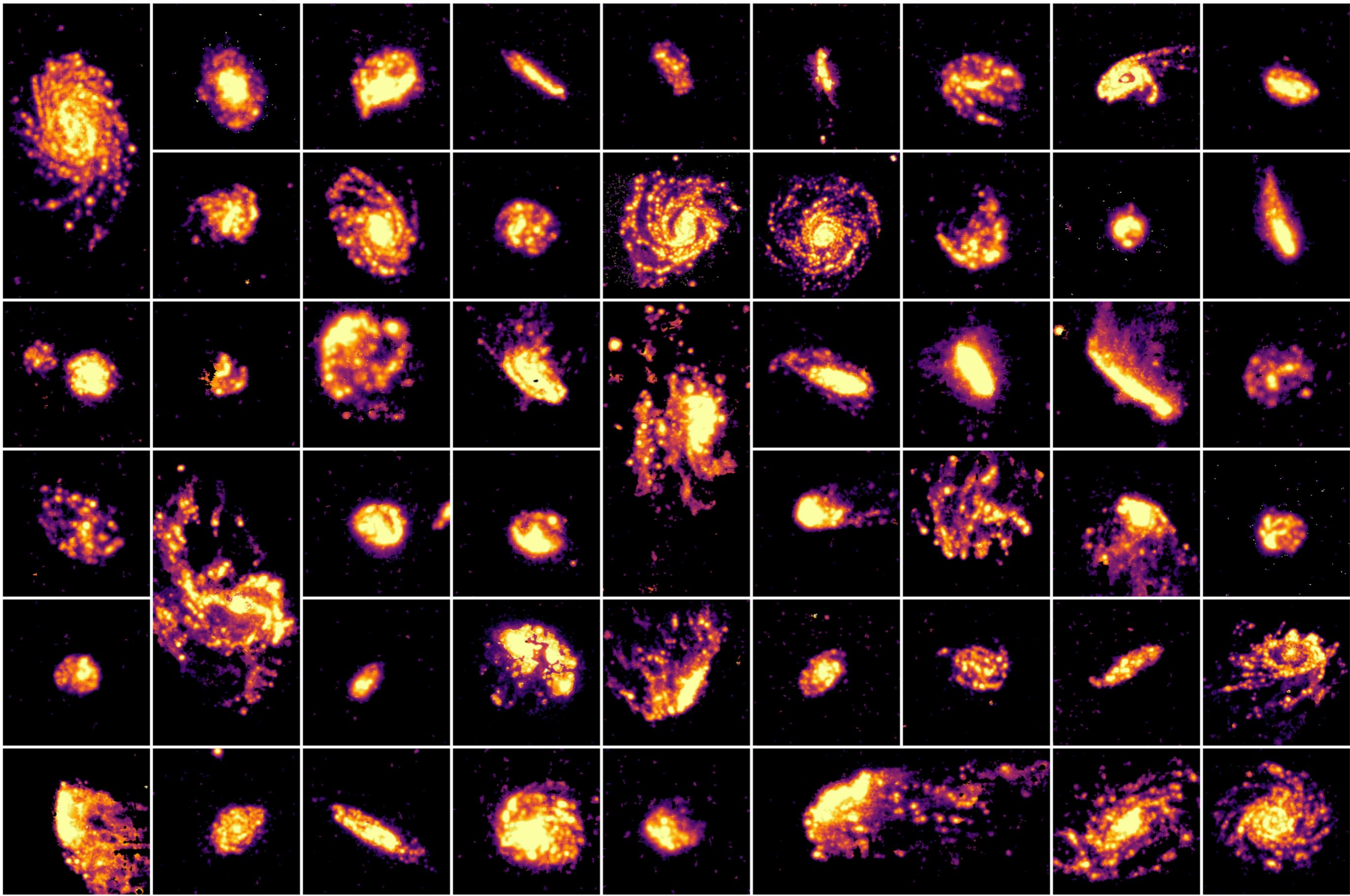
2017 Marco Gullieuszik



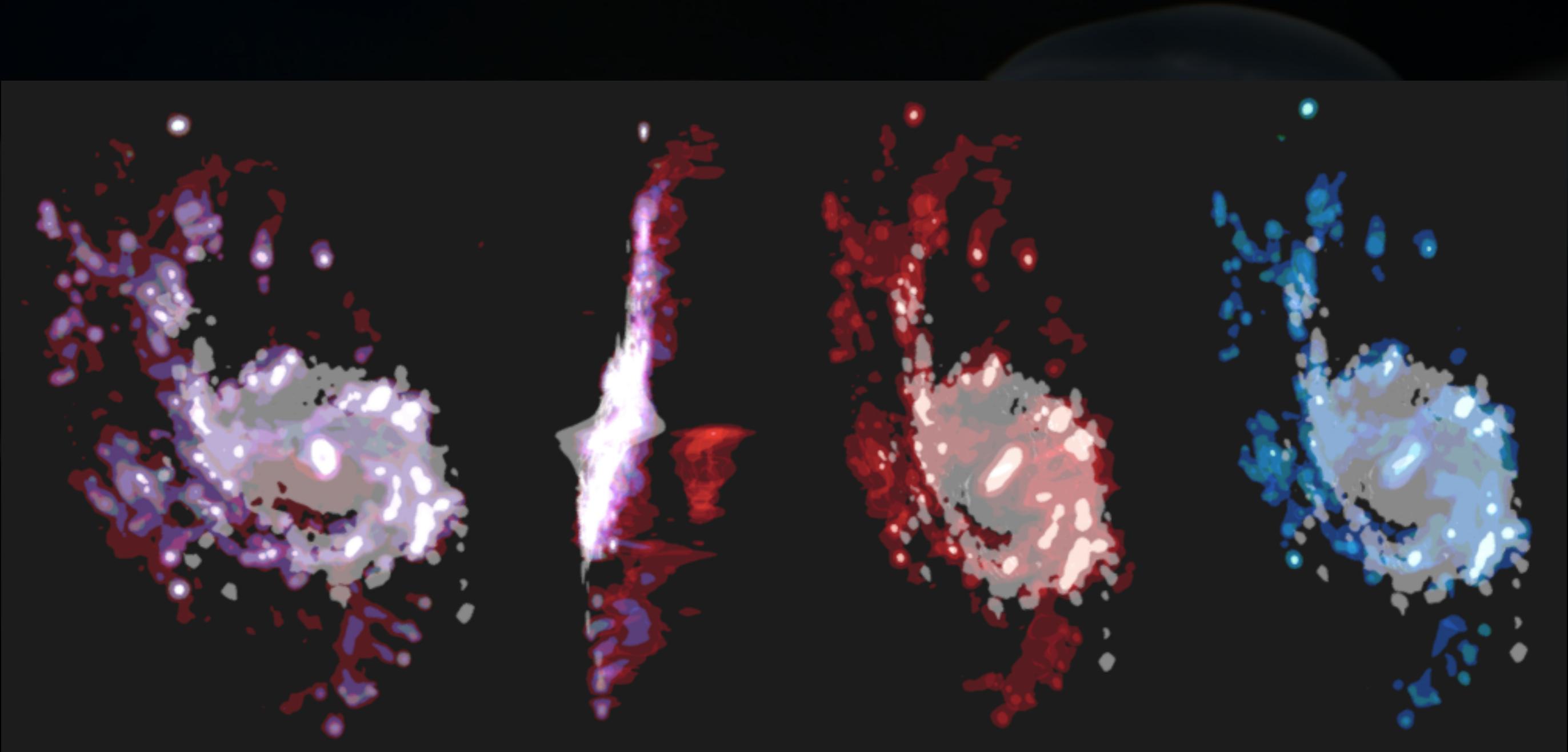
GASP Survey of Jellyfish Galaxies

GASP - GAs Stripping Phenomena in galaxies with MUSE

2017 Marco Gullieuszik



Visualising Jellyfish Galaxies



www.sr.bham.ac.uk/~callumb/aquarium/jo194



Callum Bellhouse

Untangling Jellyfish

The hard life of galaxies