

The background of the slide is a composite image of four spiral galaxies, each with a bright central core and distinct spiral arms. The galaxies are rendered in shades of blue and white, set against a dark, star-filled space. The galaxies are arranged in a roughly square pattern: one in the top-left, one in the top-right, one in the bottom-left, and one in the bottom-right. The text is overlaid on this background.

Galaxy Morphology

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Overview

- What are galaxies?
- Three kinds of galaxies
- How to classify galaxies
- Theories of galaxy evolution
- How to observe galaxies
- Galaxy NGC 4631
- Galaxy M63
- Galaxy NGC 7331

What are Galaxies?

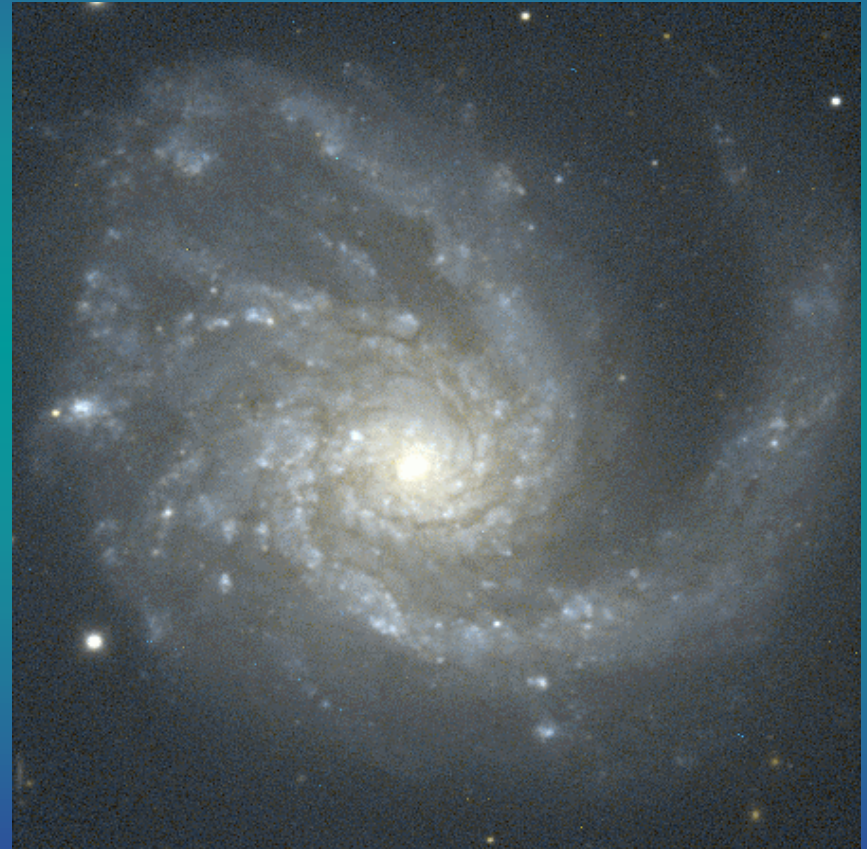
- A galaxy is a collection of billions of stars, gas, and dark matter.
- Some have stardust
- Some have a nucleus or bulge in the center



<http://antwrp.gfc.nasa.gov/apod/ap000130.html>

Spiral Galaxy

- Spiral arms
 - Blue, young stars
 - Arms are loose/tight
- Lots of gas
- Lots of dust
- Center bulge has redder older stars



Elliptical Galaxy

- No spiral structure
- Round, smooth, and featureless
- Red-orange color and old stars
- No gas
- No dust



Irregular Galaxy

Two kinds of irregulars

- Dwarf irregulars: Low mass galaxies with lots young stars
- Interacting or merging galaxies

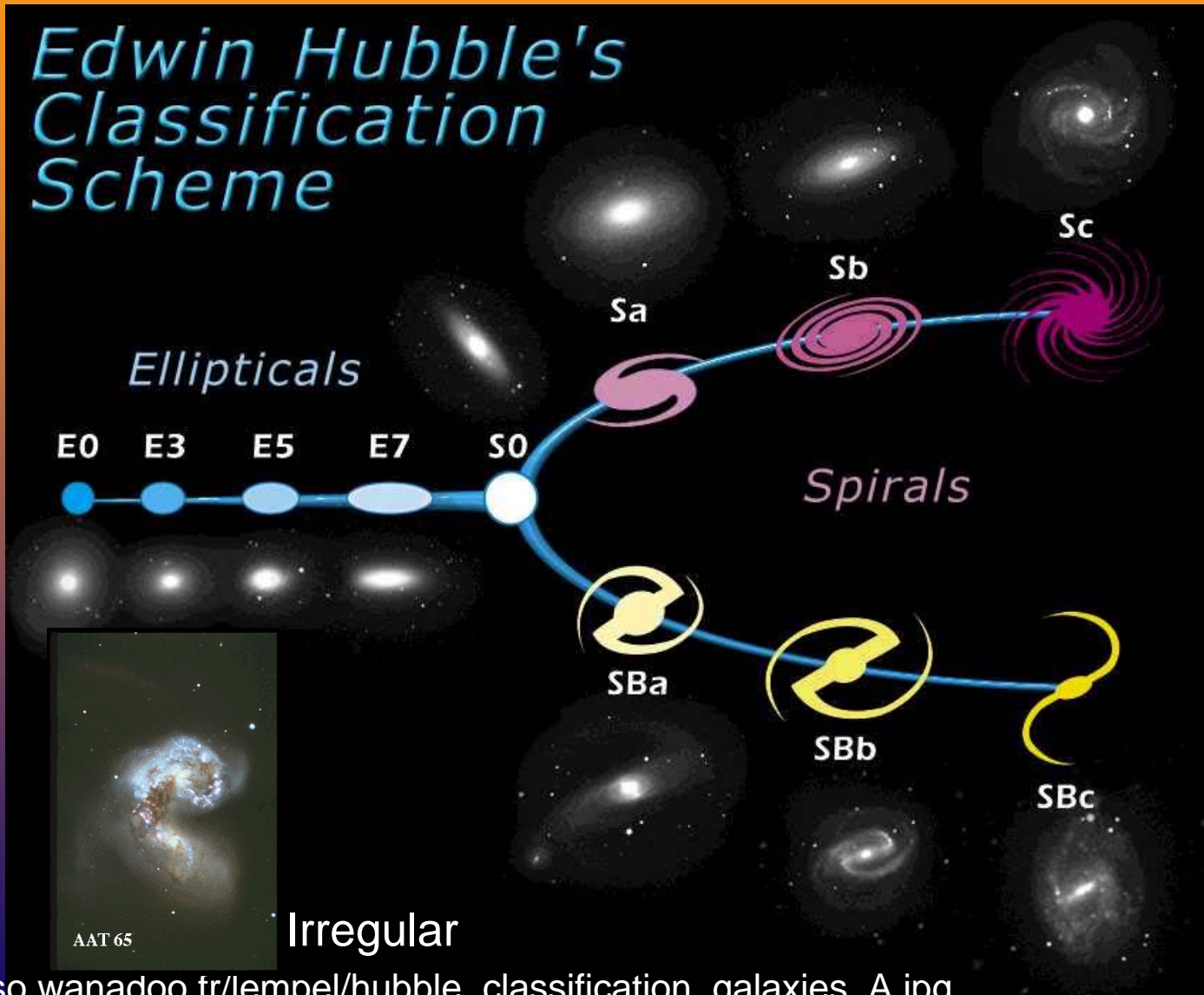


www.noao.edu/outreach/acp/observer/n4449.html



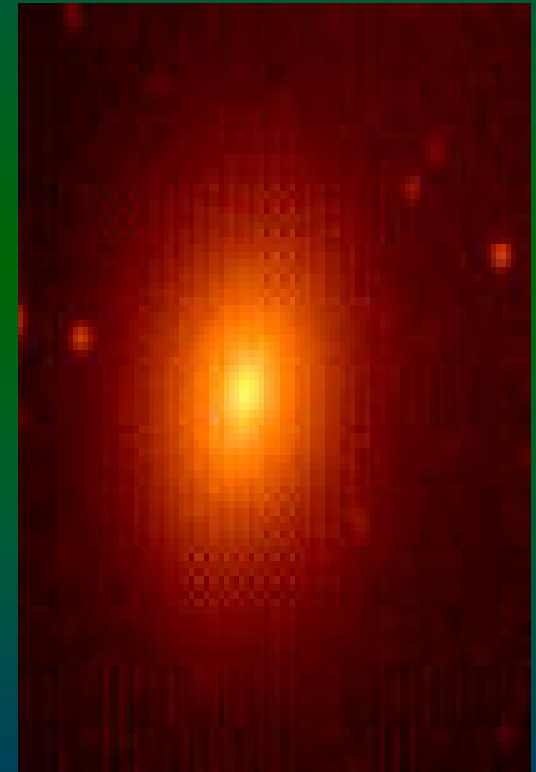
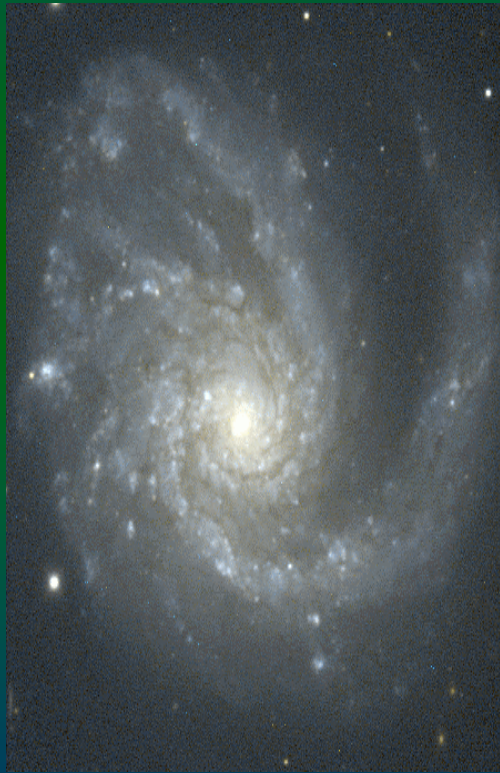
www.seds.org/pub/images/deepspace/AAT/

How to Classify Galaxies



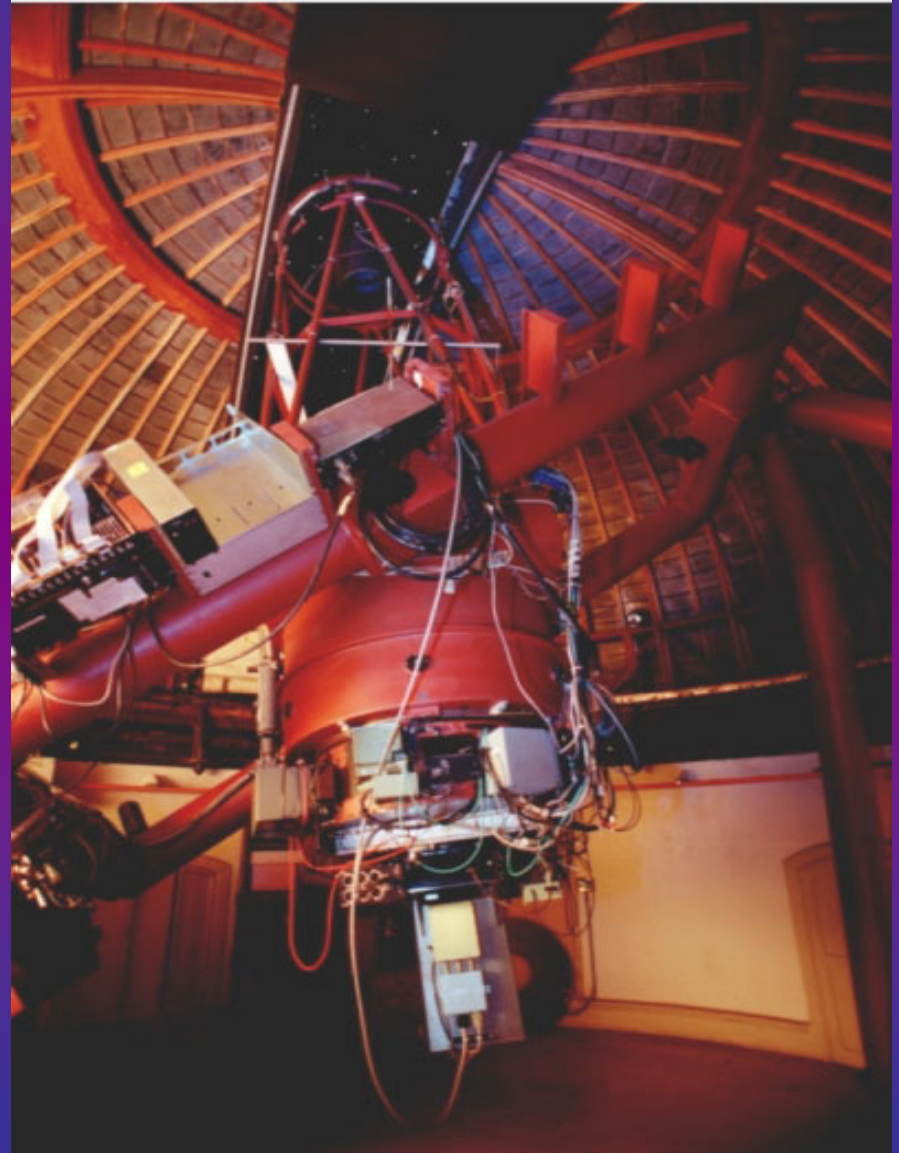
Theories of Galaxy Evolution

What are Galaxy phases?

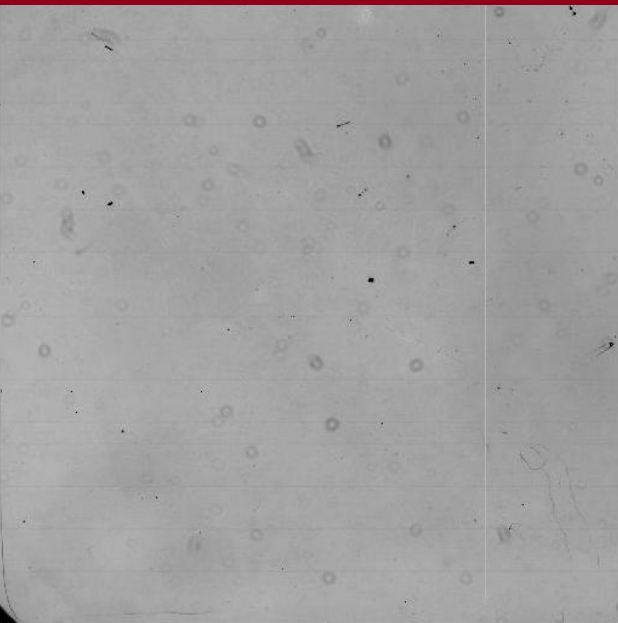


How to Observe Galaxies

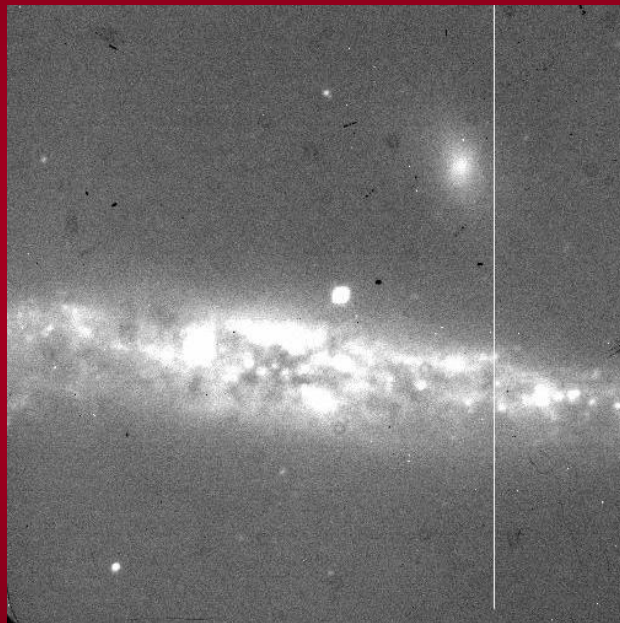
- Lick “Nickel” Telescope
- CCD camera- charged coupled device
 - saturation, hot pixels, bias, cosmic rays
- Flat field- image of uniform brightness
- Different filters:
 - red, green, blue
- Clouds



Flat Field Pictures



Flat Field image



Regular picture of galaxy.

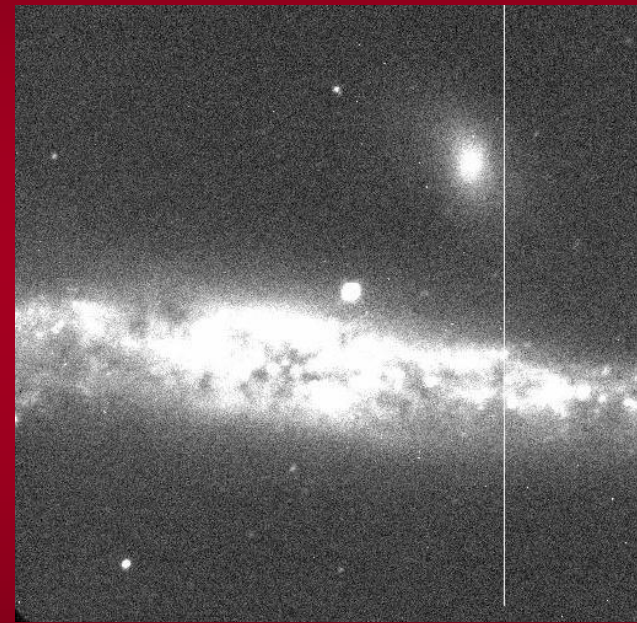
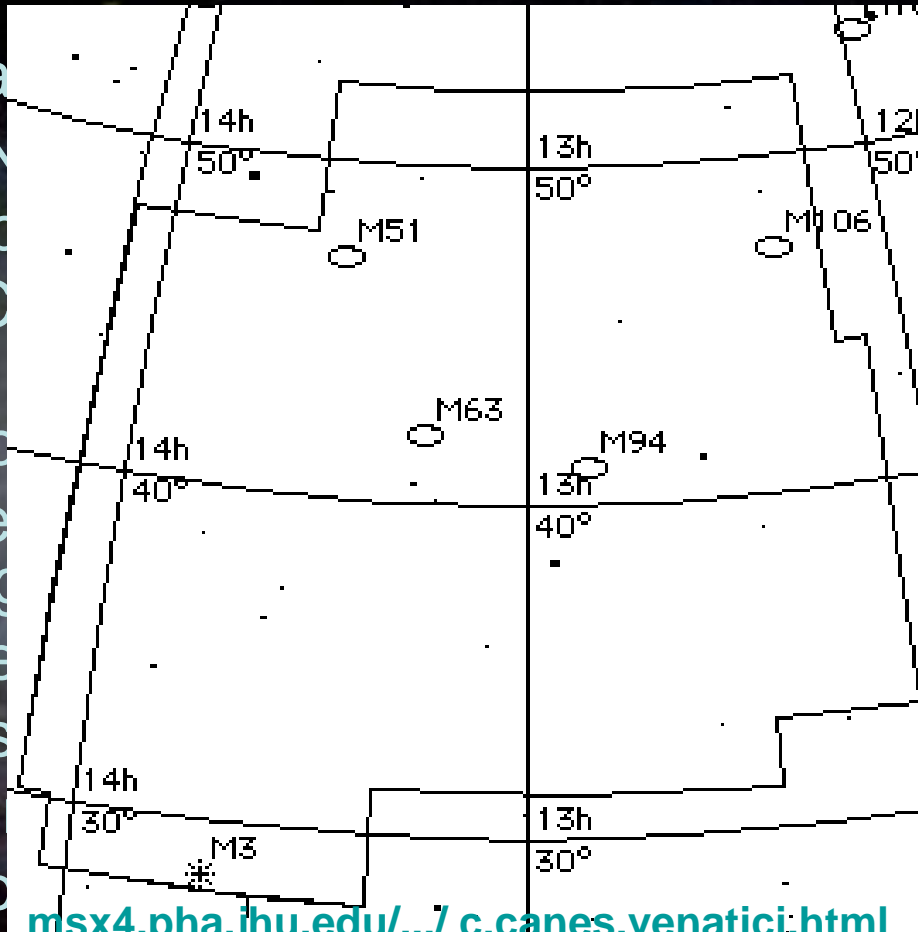


Image after dividing
the flat field.

M63

- Other name
- NGC # M
- First disc
- Part of O
- group
- Hubble c
- Distance
- million li
- 1 light ye
- Has mas
- Diamete
- Inclinatio



msx4.pha.jhu.edu/~c.canes.venatici.html

NGC 4631

“The Whale Galaxy”

- Spiral Galaxy
- Discovered by William Herschel in 1787
- Part of the Canes Venatici Constellation
- Hubble Classification: Sc
- 25 million light years away
- Size: 40,000 light years
- Inclination: 75 deg
- Partner dwarf elliptical galaxy



Galaxy NGC 7331

Our Galaxy's 'Twin'

- Spiral galaxy
- Part of the constellation of Pegasus
- Discovered by William Herschel in 1784
- Hubble Classification: Sb
- Distance is about 50 million light years away
- Mass of about 140 billion suns
- Size is about 71,000 light years
- Has an inclination of about 58 degrees
- Best observed in August at midnight

Conclusion

- There are three major classifications of galaxies.
- Colors of galaxies can tell you a lot about the age of galaxy's stars.
- Color images are made by using three different filters.
- Galaxies can morph into different shapes.
- Galaxies can be seen at different viewing angles.

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- Cluster 7 for all the support and good times!

Bibliography

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