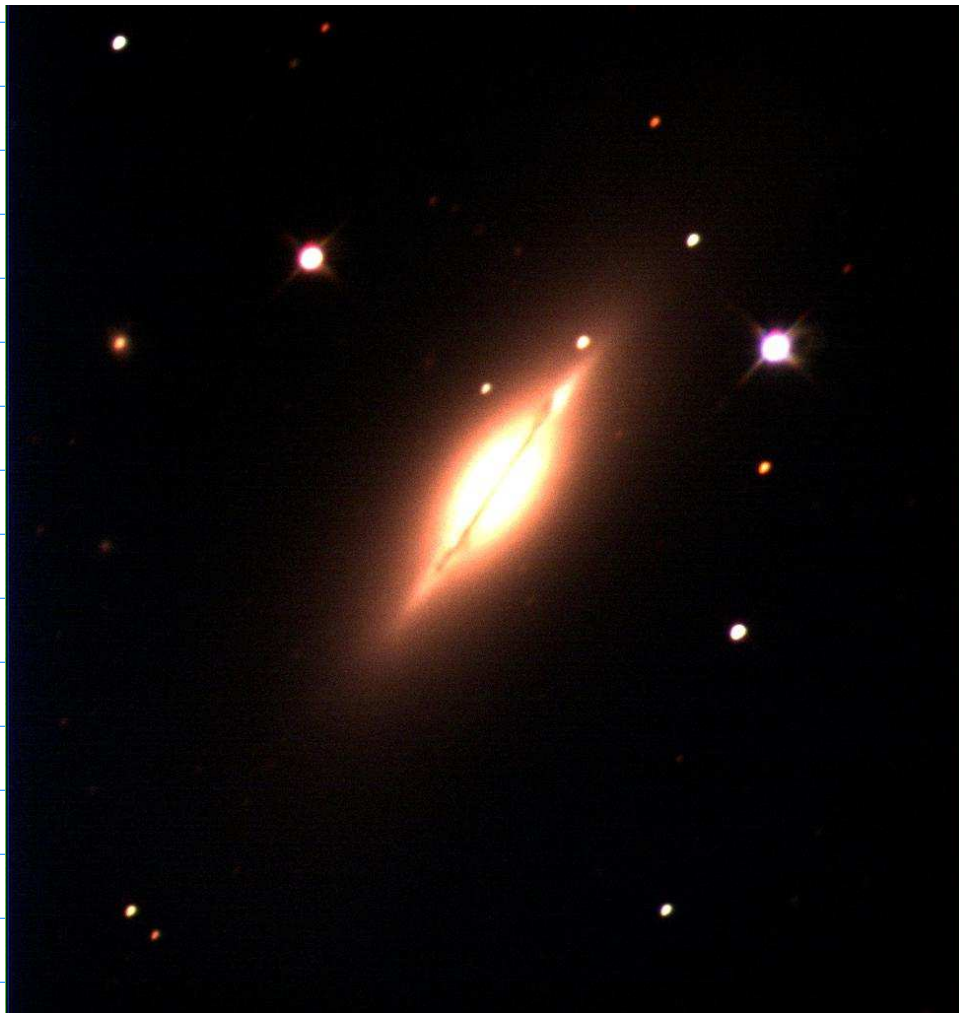


THE MASSES OF ELLIPTICAL GALAXIES VARY FROM 10% OF THE MASS OF THE MILKY WAY UP TO 10 OR 100 TIMES THE MASS OF OUR GALAXY.

SPIRAL GALAXIES (S):

SØ (OR LENTICULAR) GALAXIES:



THEY HAVE A VERY LARGE NUCLEUS AND HARDLY VISIBLE SPIRAL ARMS.

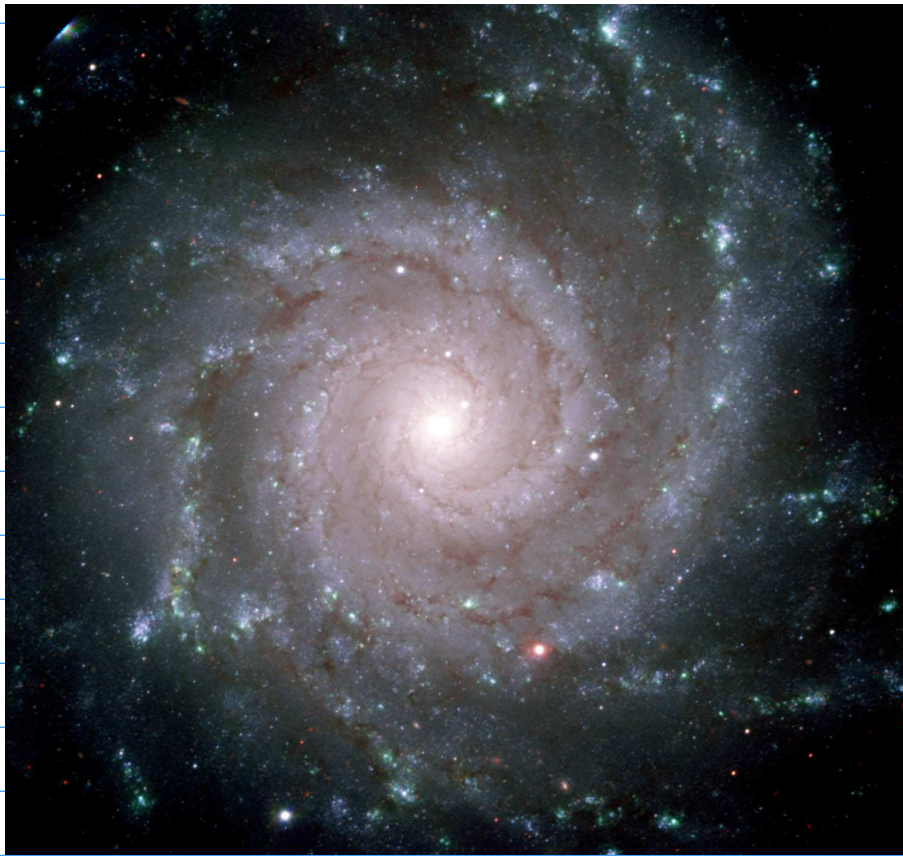
## Sa GALAXIES :



THESE GALAXIES HAVE LARGE NUCLEI, LESS GAS AND DUST AND FEWER HOT LUMINOUS YOUNG STARS COMPARED TO Sb AND Sc.

## Sc GALAXIES :

THESE GALAXIES HAVE SMALL NUCLEI, LOTS OF GAS AND DUST CONCENTRATED IN SPIRAL ARMS, AND MANY HOT, LUMINOUS, YOUNG STARS LOCATED IN SPIRAL ARMS. HENCE THEY APPEAR BLuish IN COLOR.



Sb GALAXIES ARE BETWEEN Sa AND Sc ACCORDING TO THE SIZE OF THE NUCLEUS, AMOUNT OF GAS AND DUST, AND THE NUMBER OF HOT, BRIGHT STARS.

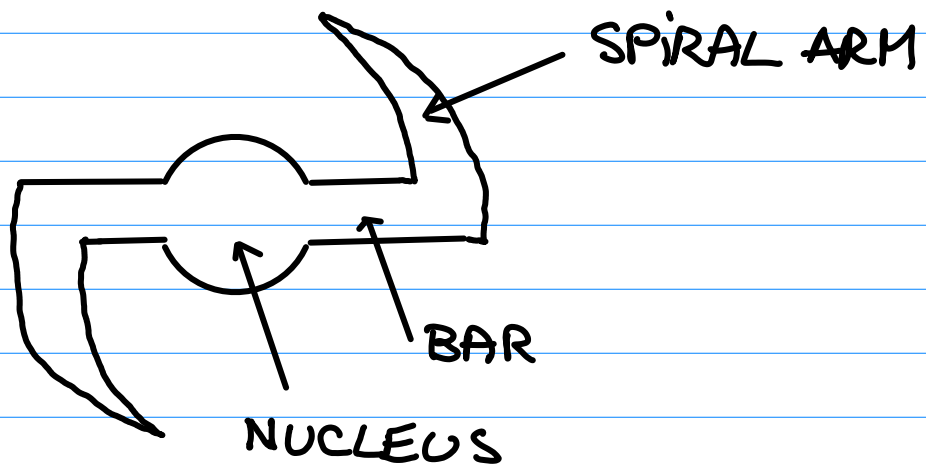
ABOUT  $\frac{2}{3}$  OF SPIRAL GALAXIES ARE SO-CALLED BARRED SPIRAL GALAXIES (SB). THEY ARE DIVIDED INTO SBa, SBb AND SBc ACCORDING TO THE SAME CRITERIA USED FOR ORDINARY SPIRALS.

Barred Spiral Galaxy NGC 1300



Hubble  
Heritage

NASA, ESA, and The Hubble Heritage Team (STScI/AURA) • Hubble Space Telescope ACS • STScI-PRC05-01



## IRREGULAR GALAXIES (Irr):

THESE GALAXIES ARE A CHAOTIC MIX OF GAS AND DUST WITH NO OBVIOUS NUCLEUS AND SPIRAL ARMS:





IRREGULAR GALAXY I Zwicky 18



LARGE  
MAGELLANIC  
CLOUD

SMALL MAGELLANIC CLOUD

THEY BELONG TO THE LOCAL GROUP (A GALAXY CLUSTER WHICH CONTAINS THE MILKY WAY).

ELLIPTICAL GALAXIES ACCOUNT FOR ABOUT  $\frac{1}{3}$  OF THE GALAXIES THAT WE OBSERVE.

SPIRAL GALAXIES MAKE UP THE MAJORITY OF BRIGHTER GALAXIES THAT WE OBSERVE.

THE IRREGULAR GALAXIES ARE SMALL AND THEREFORE NOT VERY LUMINOUS, AND ARE HARDER TO OBSERVE AT LARGE DISTANCES. HOWEVER, THEY COULD BE THE MOST COMMON TYPE OF GALAXY.

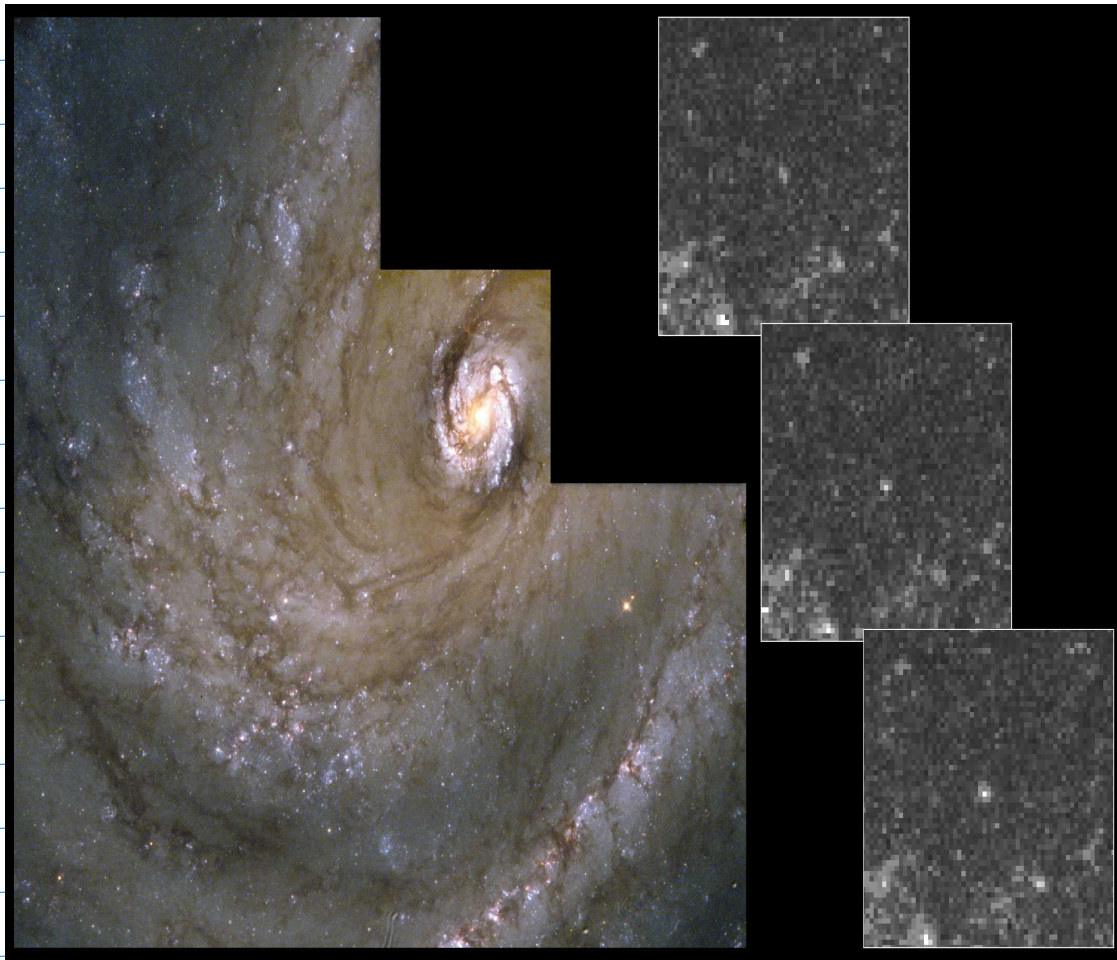
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## MEASURING THE DISTANCES TO GALAXIES:

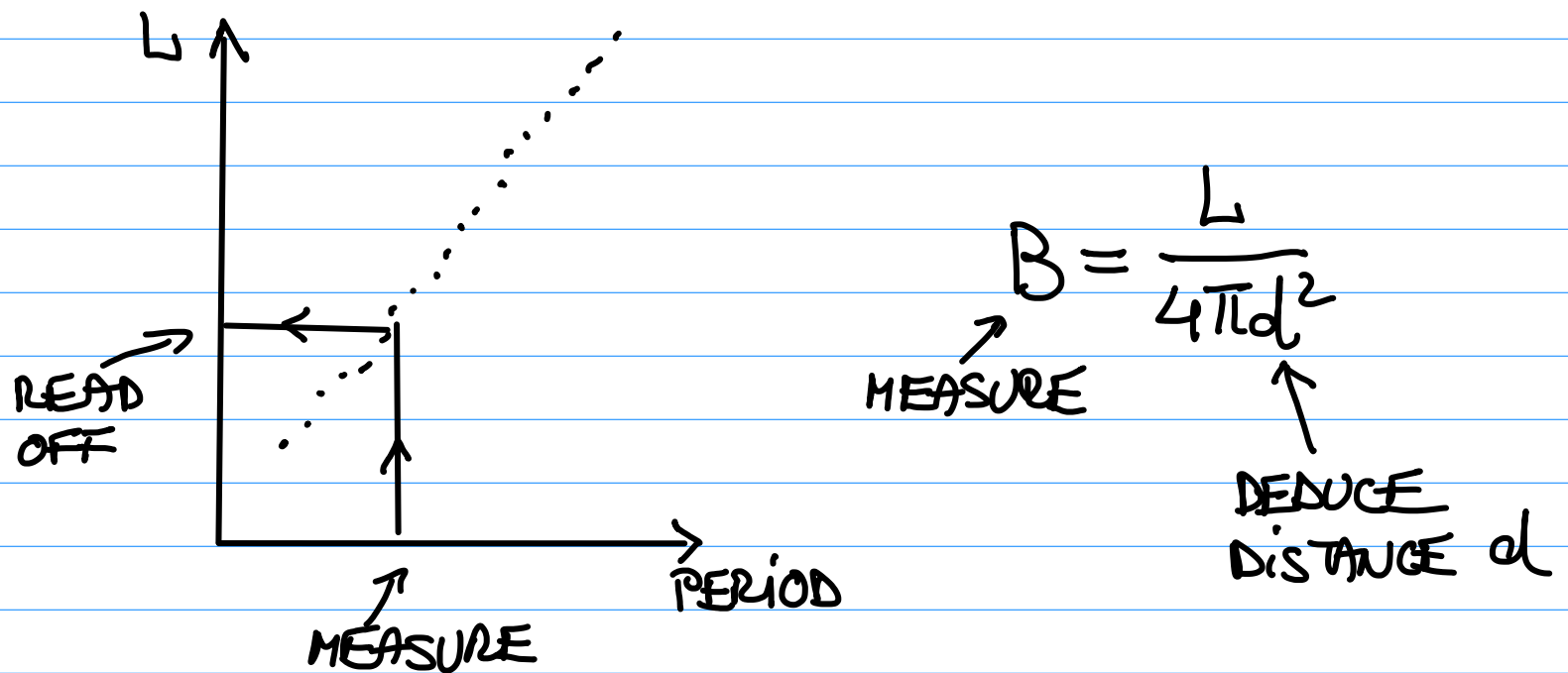
EVEN THOSE THAT ARE CLOSEST TO US (E.G. THE LARGE MAGELLANIC CLOUD) ARE DISTANT ENOUGH (170,000 ly) THAT THE METHOD OF STELLAR PARALLAX WOULD FAIL.

- 1) FOR GALAXIES THAT ARE NOT TOO DISTANT ASTRONOMERS USE THE METHOD OF CEPHEID VARIABLES, USING THE PERIOD-LUMINOSITY

RELATION FOR SUCH STARS.



SPIRAL GALAXY M100



THIS METHOD WORKS FOR THE DISTANCES UP TO

100 MILLION LIGHT-YEARS.