

# The Cosmic Distance Ladder

<https://adambatten.com/talks/>

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VSSEC Work Experience

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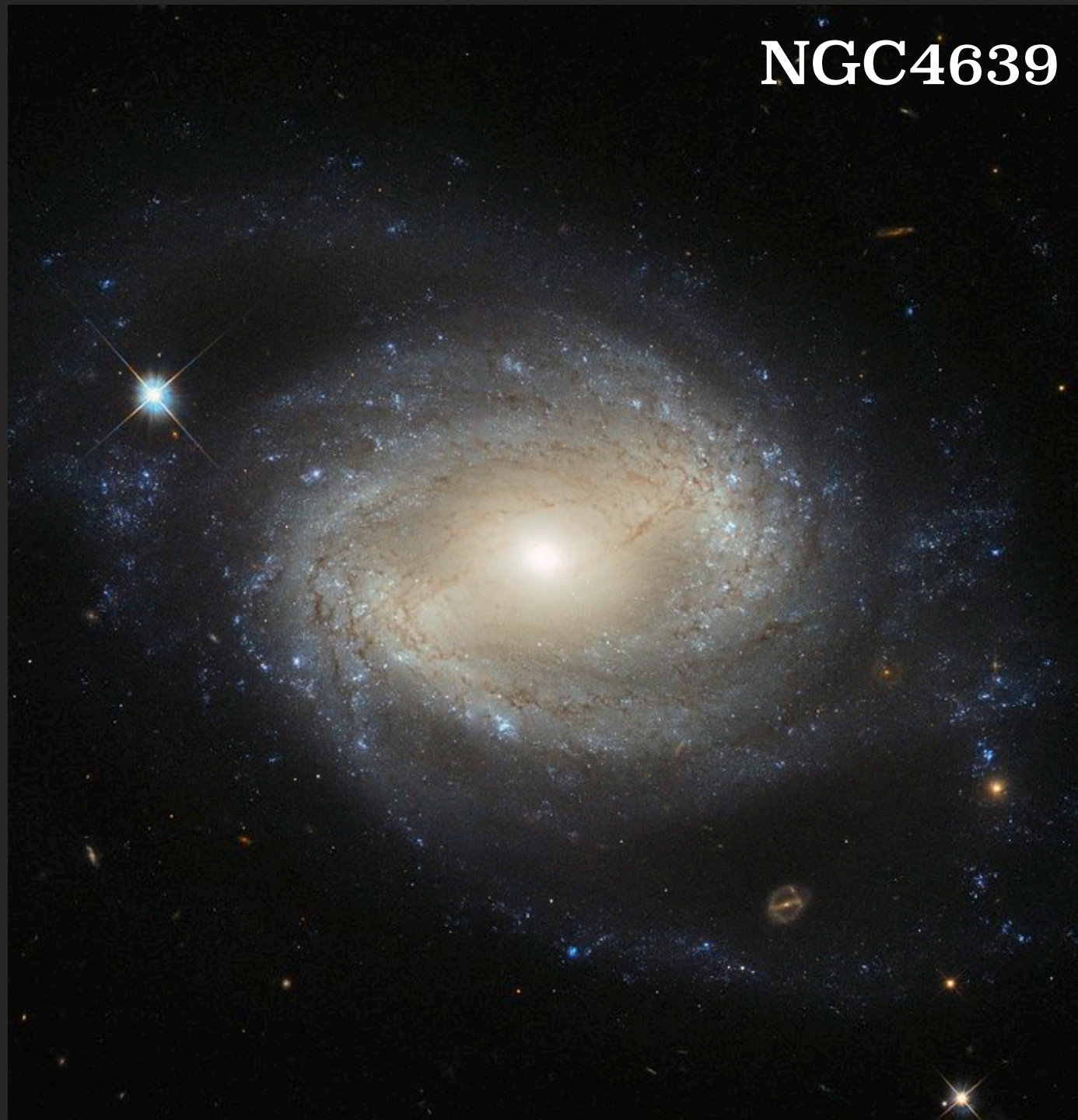
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SWINBURNE  
UNIVERSITY OF  
TECHNOLOGY



NGC4639

How far away is  
this galaxy?







By Bengt Nyman from Vaxholm, Sweden - NZ7\_2542, CC BY 2.0



How far away is St. Paul's  
Cathedral?





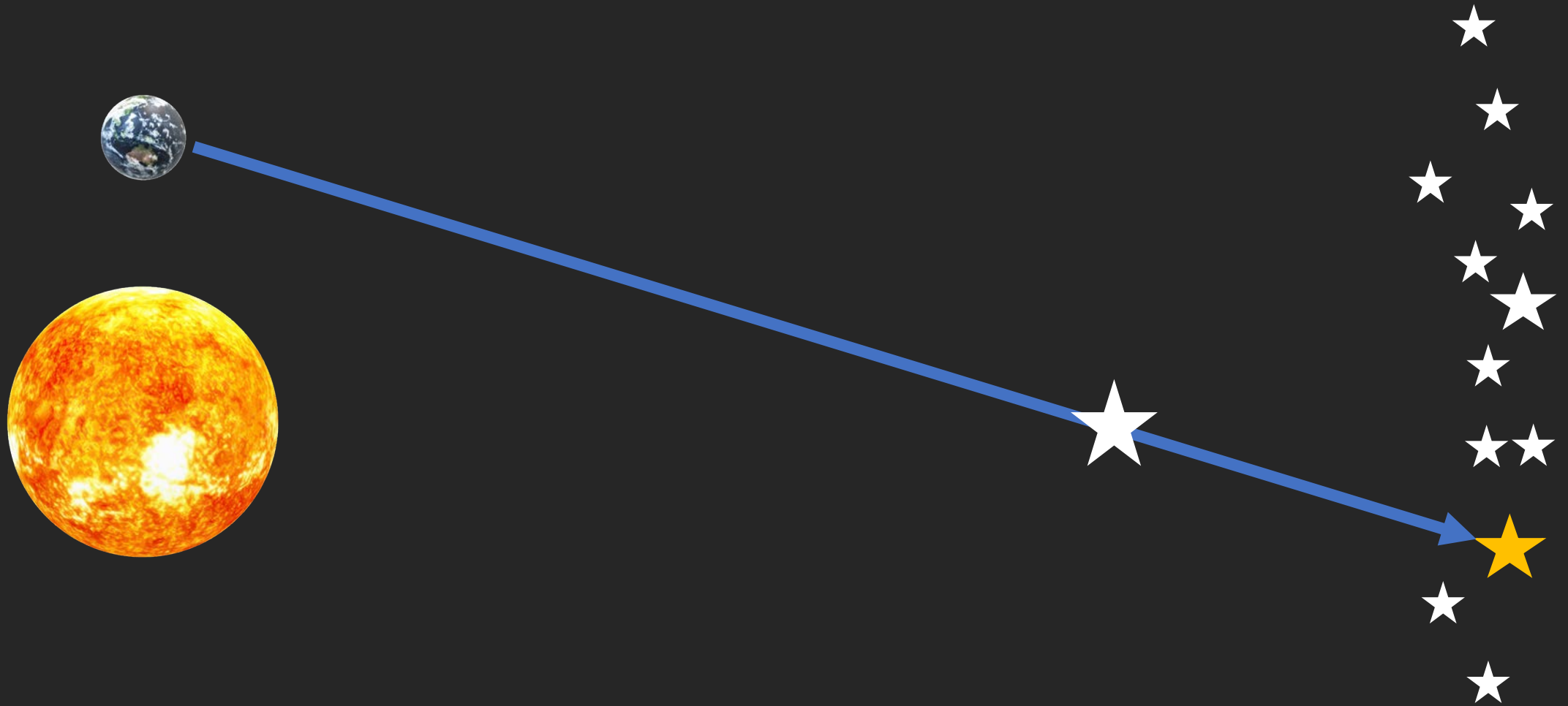
# Distance Measurement Tool #1: Parallax



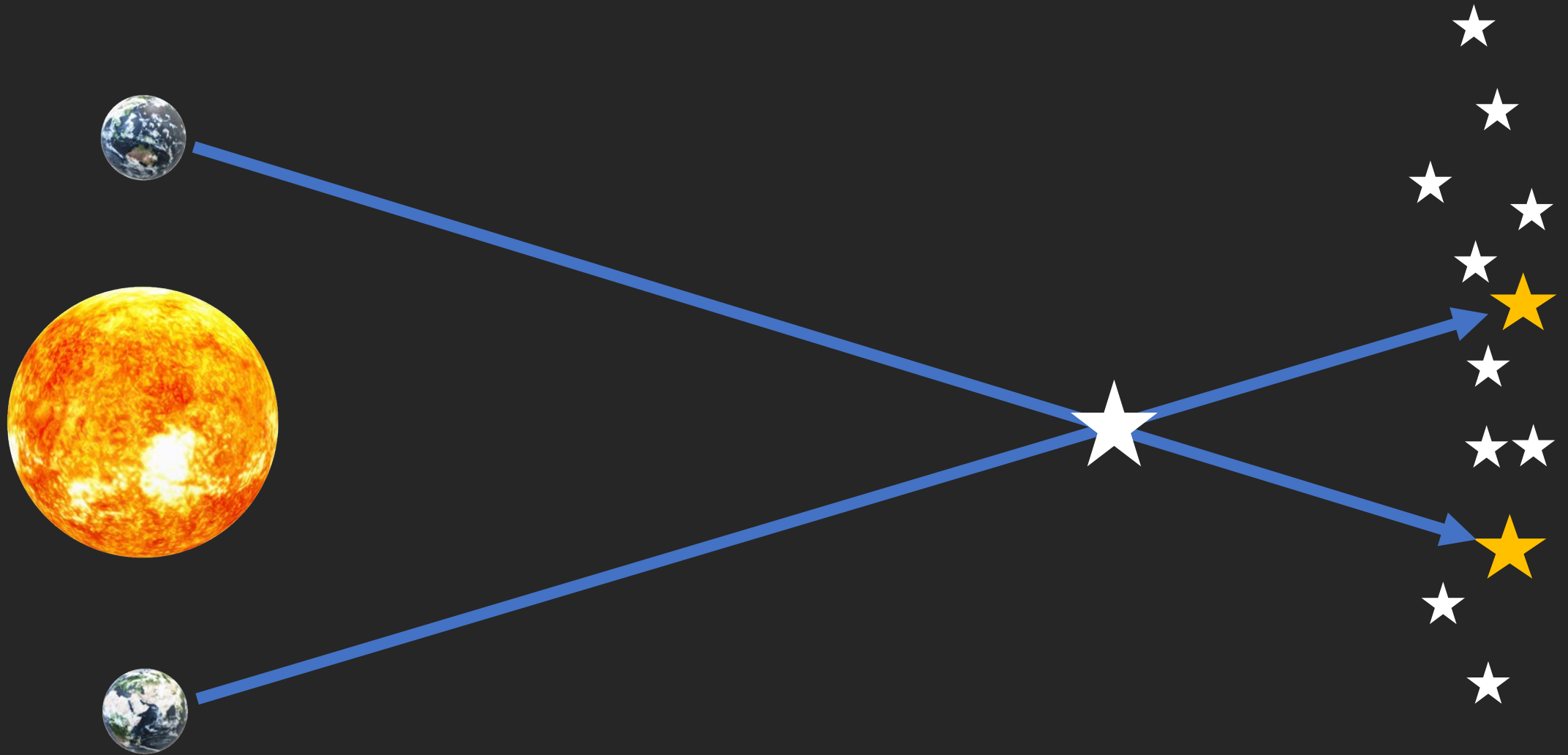
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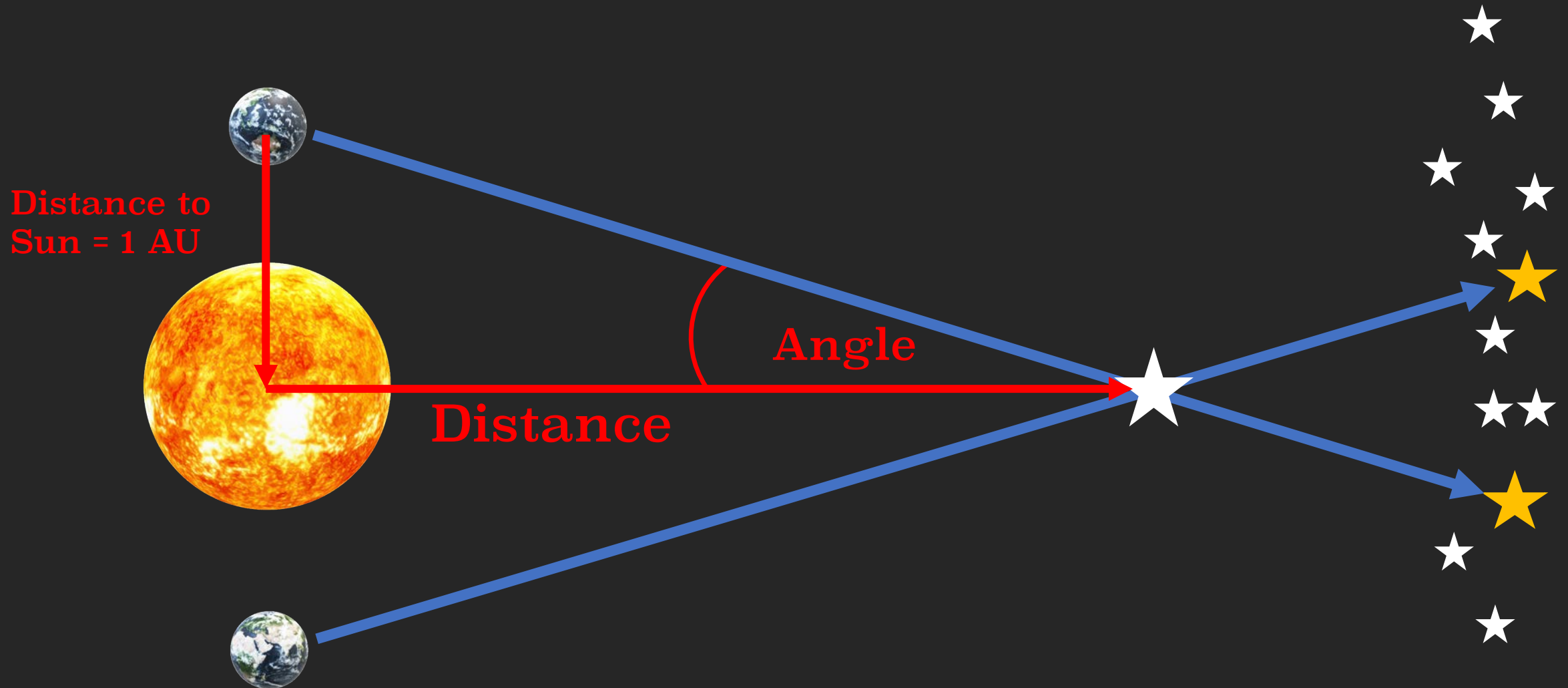


# Distance Measurement Tool #1: Parallax



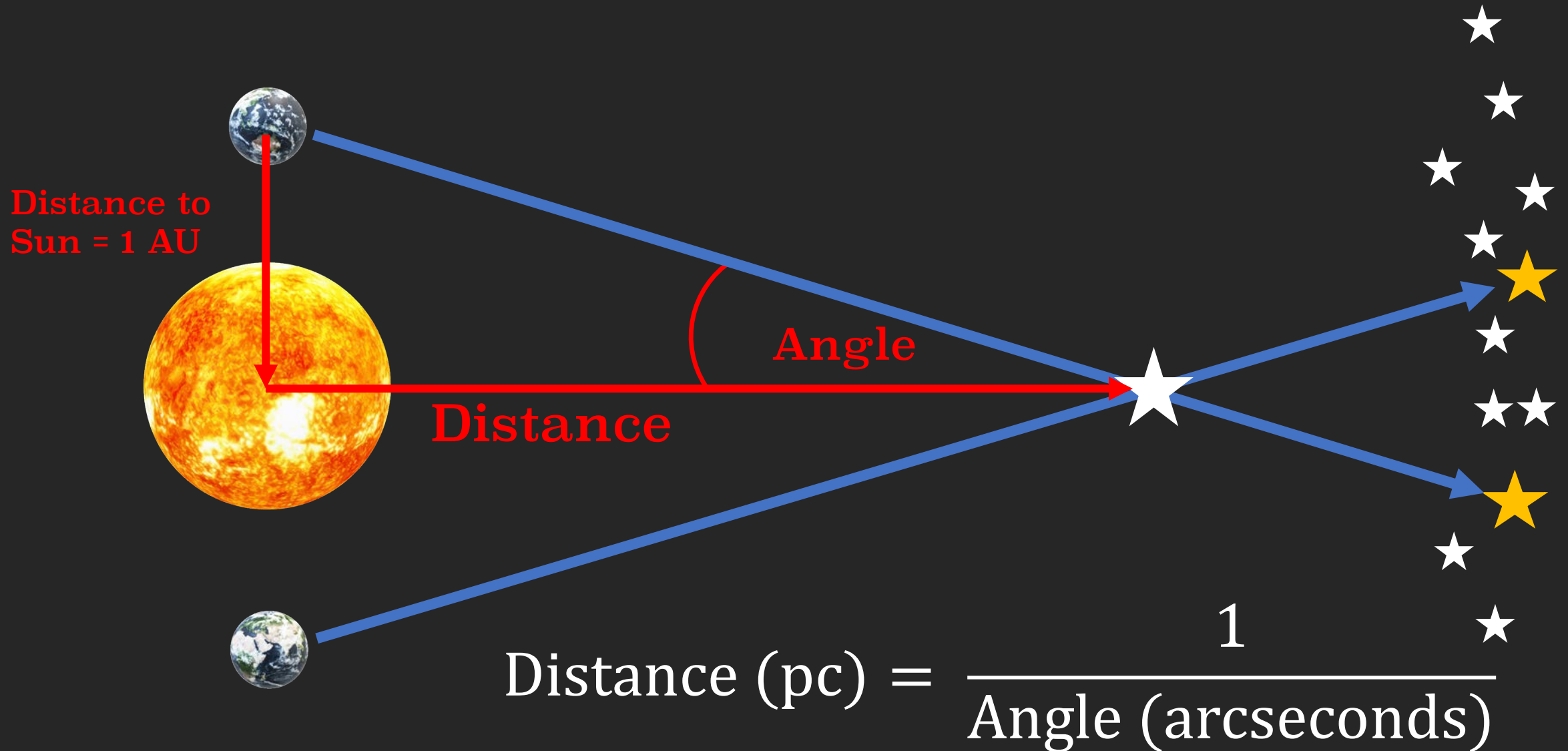


# Distance Measurement Tool #1: Parallax





# Distance Measurement Tool #1: Parallax





# Distance Measurement Tool #2:





# Distance Measurement Tool #2: Supernovae



NGC1365



# Distance Measurement Tool #2: Type Ia Supernovae

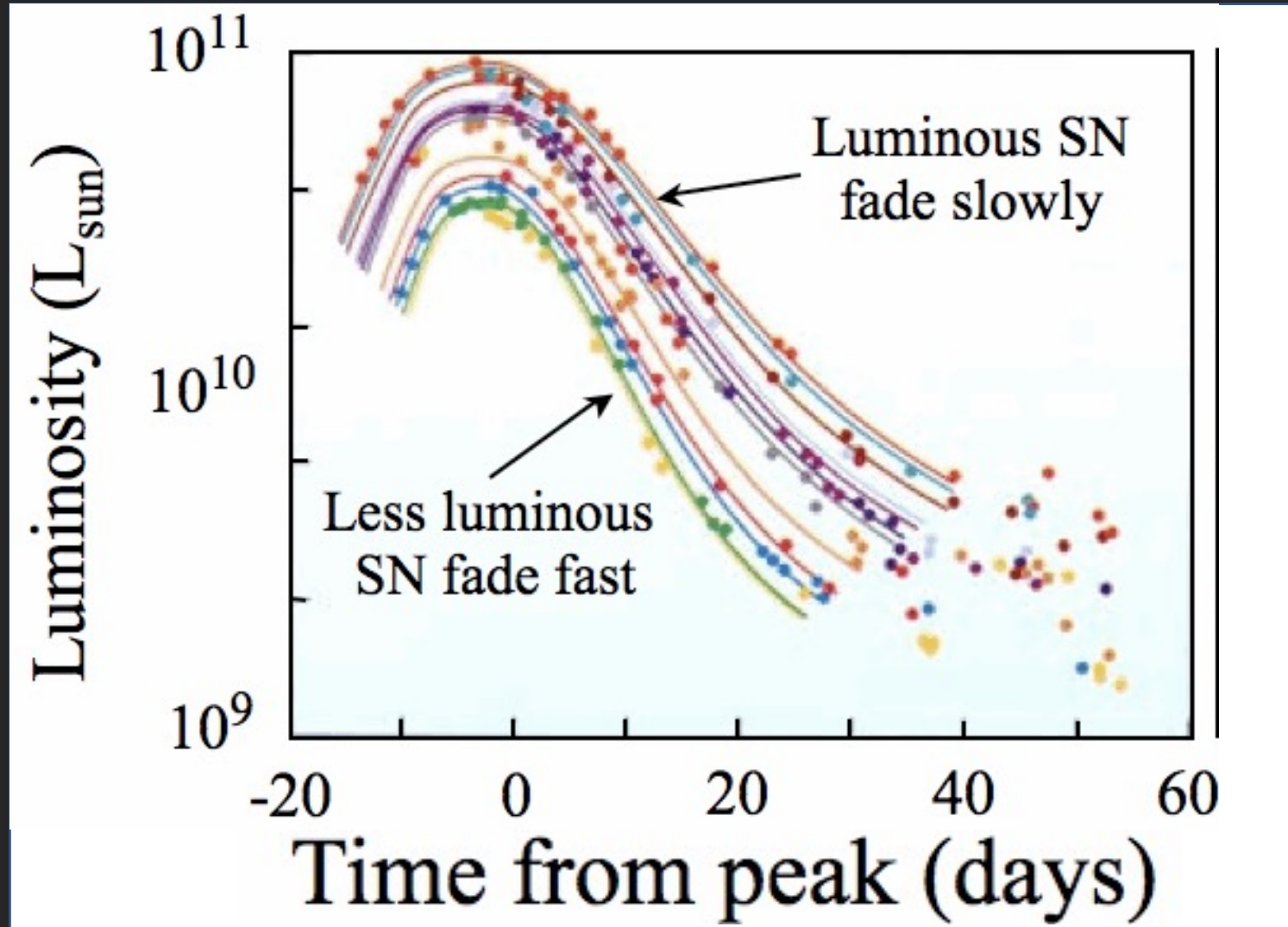




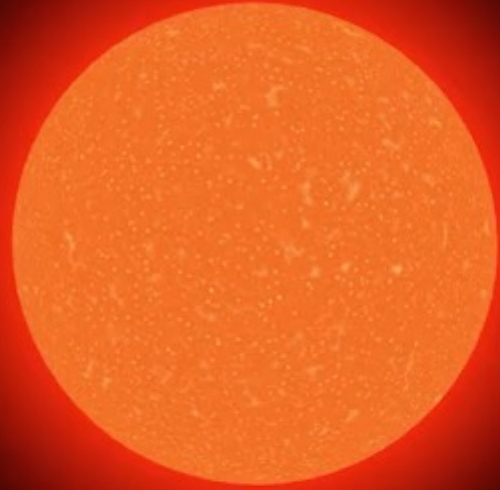
73.3

Cosmic  
Distance  
Ladder

# Distance Measurement Tool #2: Type Ia Supernovae



# Distance Measurement Tool #3: Cepheid Variable Stars





# Cosmic Distance Ladder

Parallax

+ Accurate!

- Can only be  
used on stars  
inside our  
galaxy.

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- Can only be used on stars inside our galaxy.

**Supernovae**

+ Can be used for large distances!

- Needs to have calibrations from known distances.



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**Parallax**

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**Supernovae**

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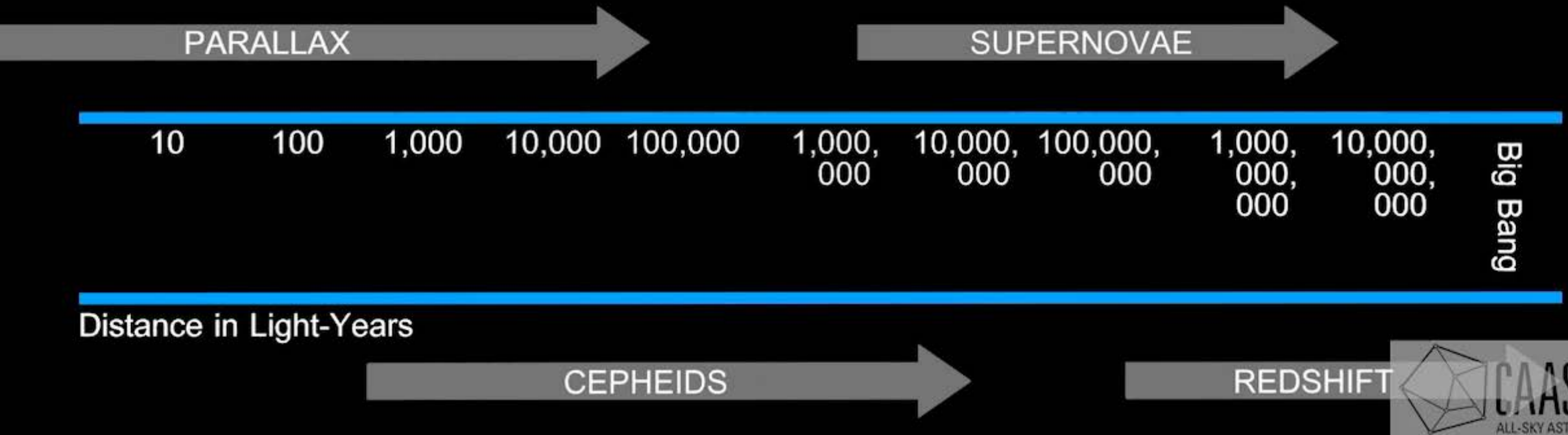
- Needs to have calibrations from known distances.

**Cepheids**

+ Can be found in our galaxy and nearby galaxies!

- Needs to have calibrations from known distances.

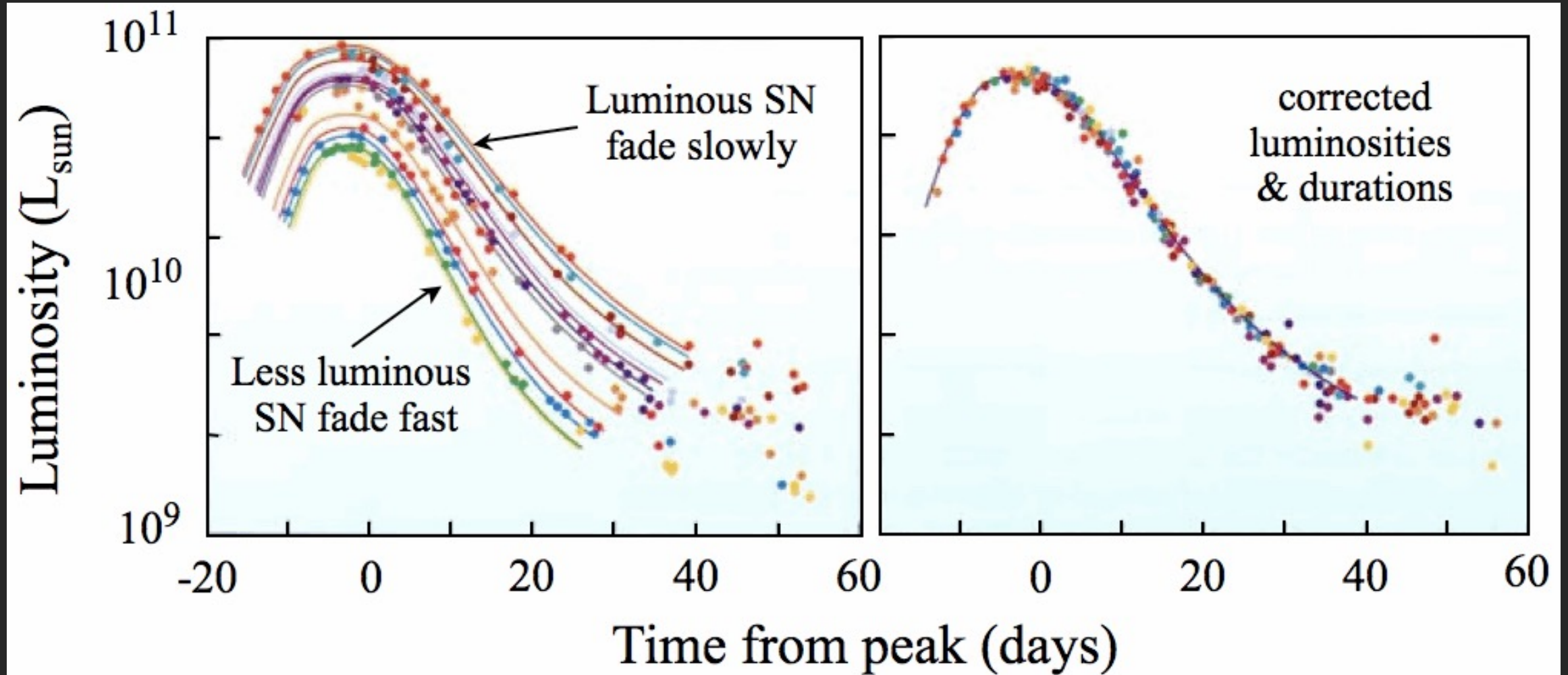
# Cosmic Distance Ladder







# Corrected Supernovae Luminosities





# Cosmic Distance Ladder

Distance to the Sun



Parallax



Cepheid Variable  
Stars



Supernovae



$H_0$

