

*Nature's Grandest Sky Spectacles:
Eclipses...and Transits, too*

Dr. Doug Duncan

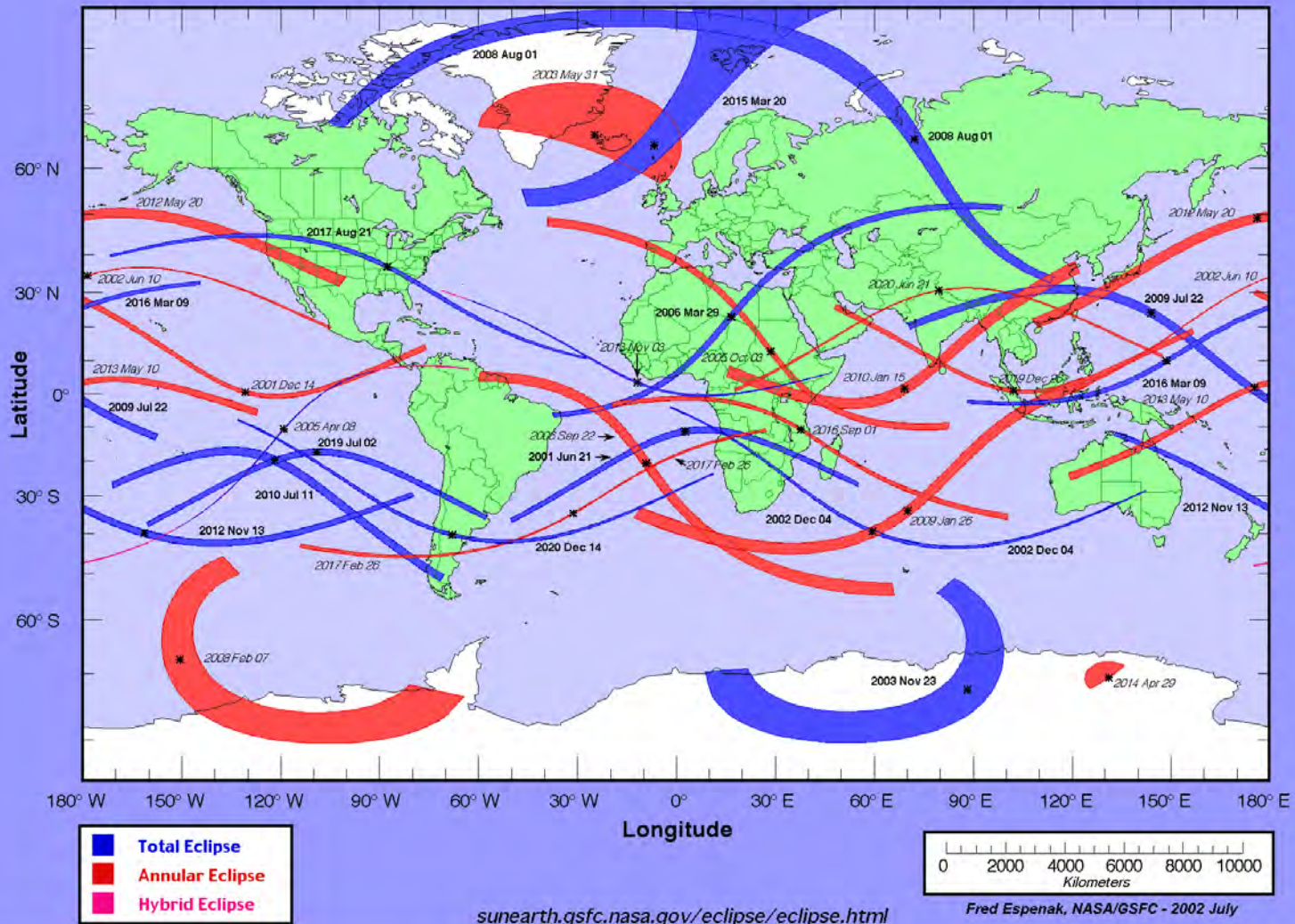


Güneş Tutulması, 29 Mart 2006, Çolaklı/Side, Türkiye



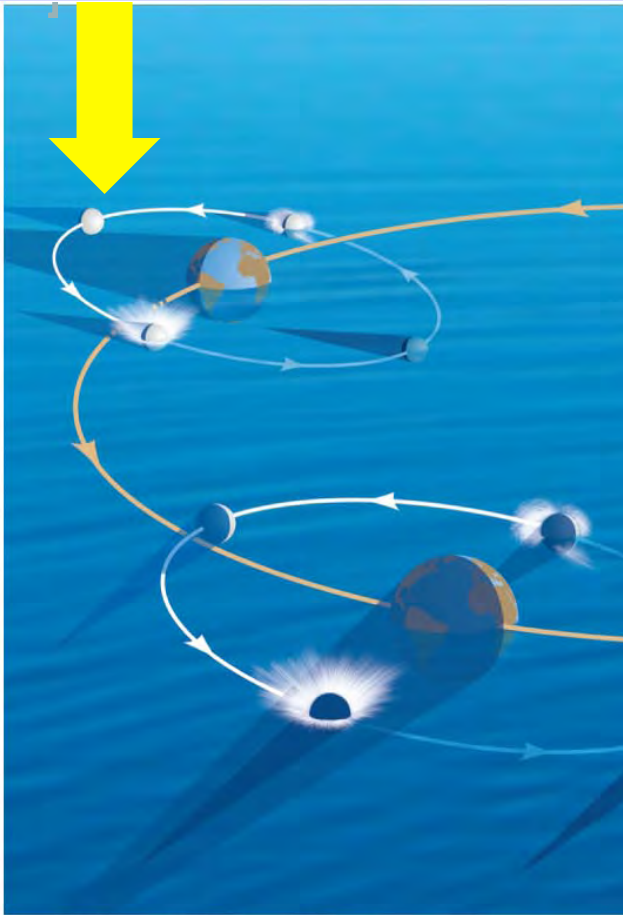
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Total and Annular Solar Eclipse Paths: 2001 – 2020

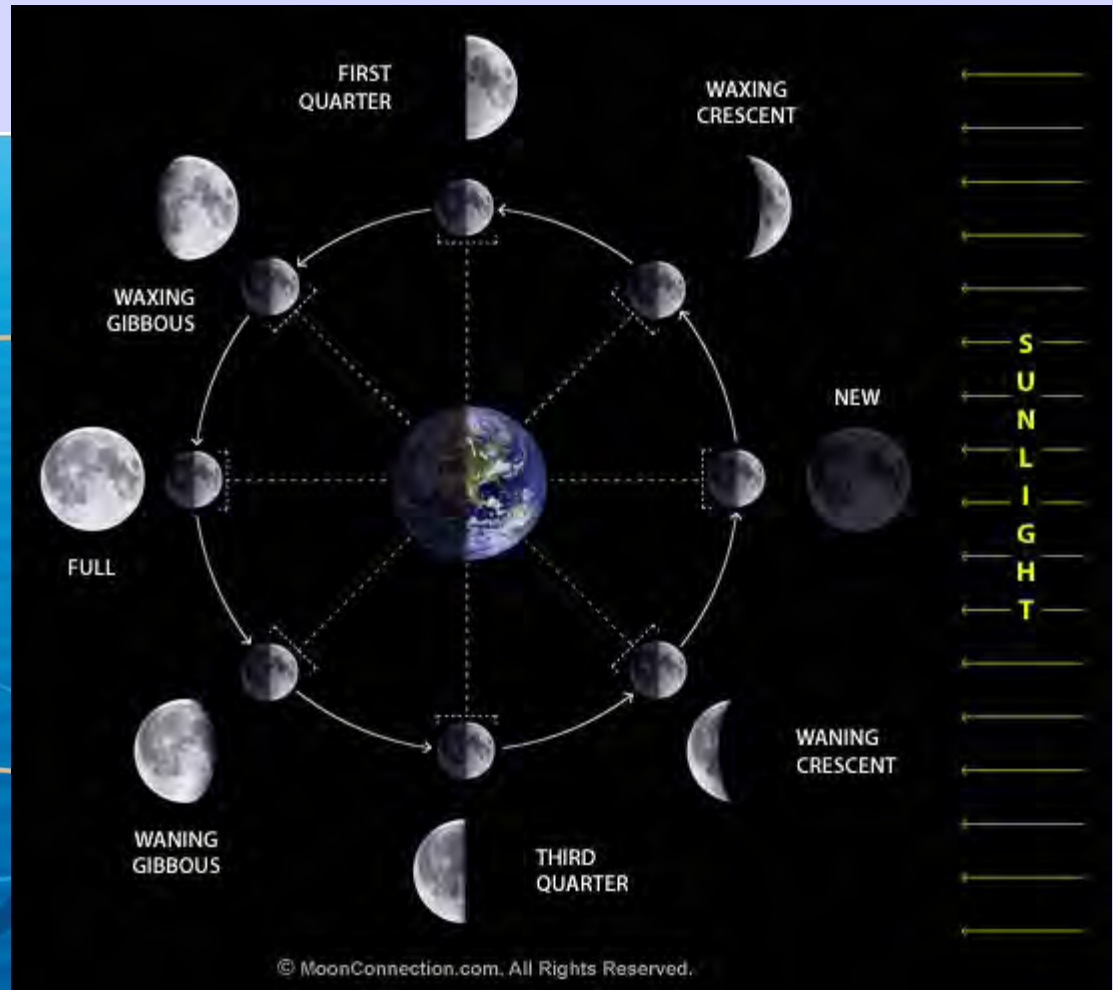


Why do eclipses happen?

Into the shadow... but
it doesn't disappear...



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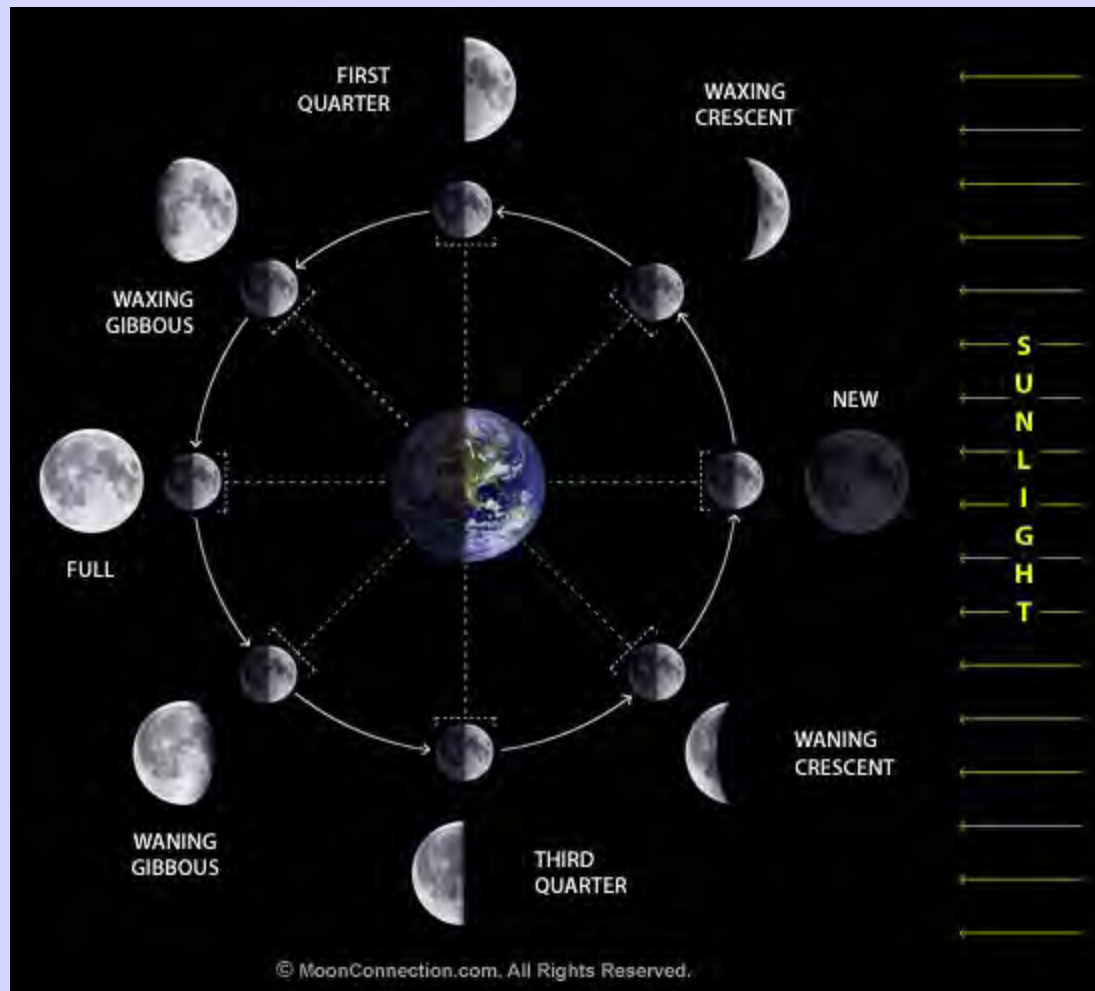


Not to scale!

Why is the moon red at the time of a lunar eclipse?
-because the sky is blue!

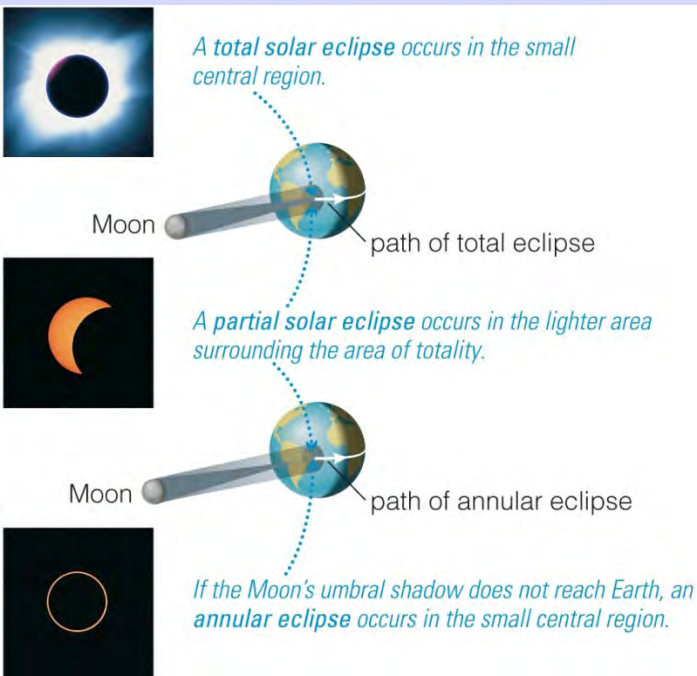


At what phase does a lunar eclipse occur?
Where do you have to be to see it?



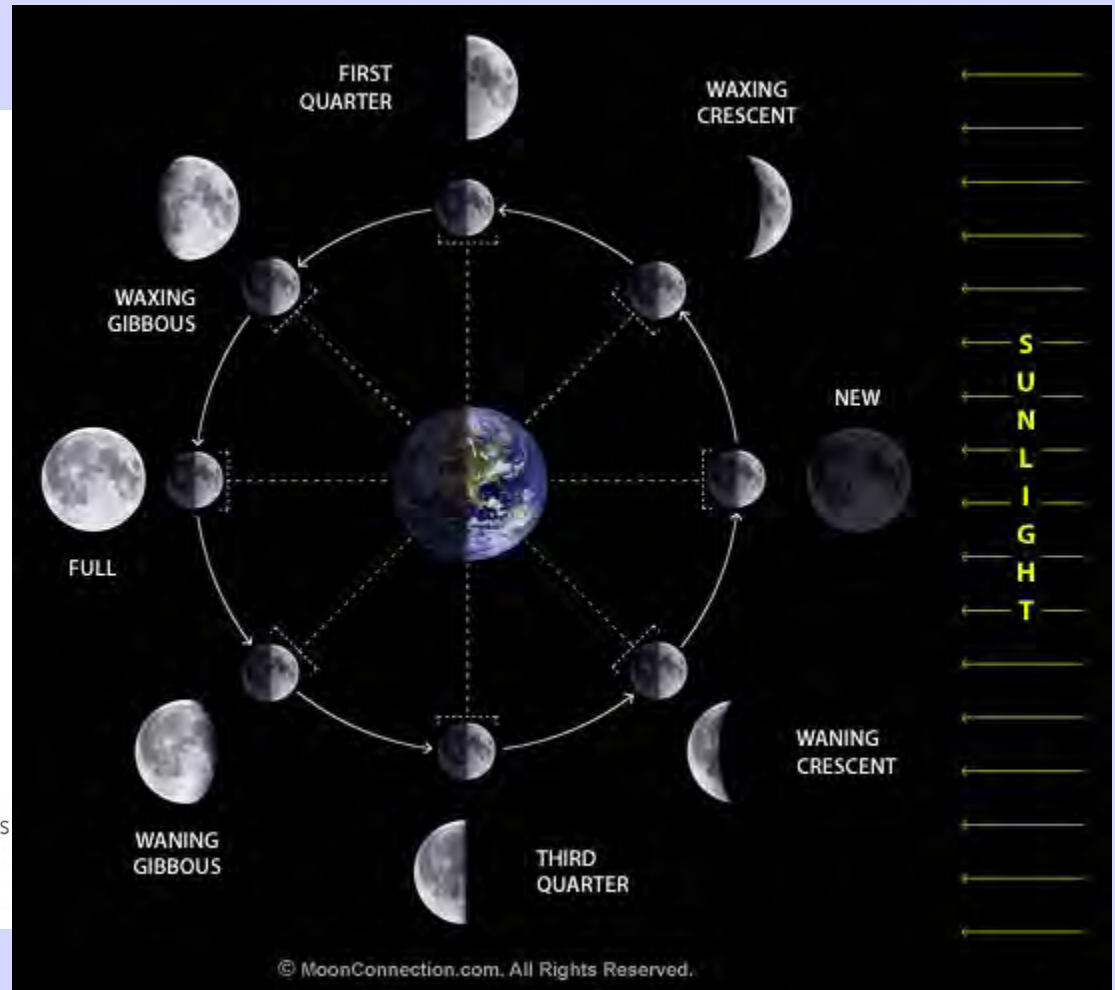
At what phase does a solar eclipse occur?

Where do you have to be to see it?

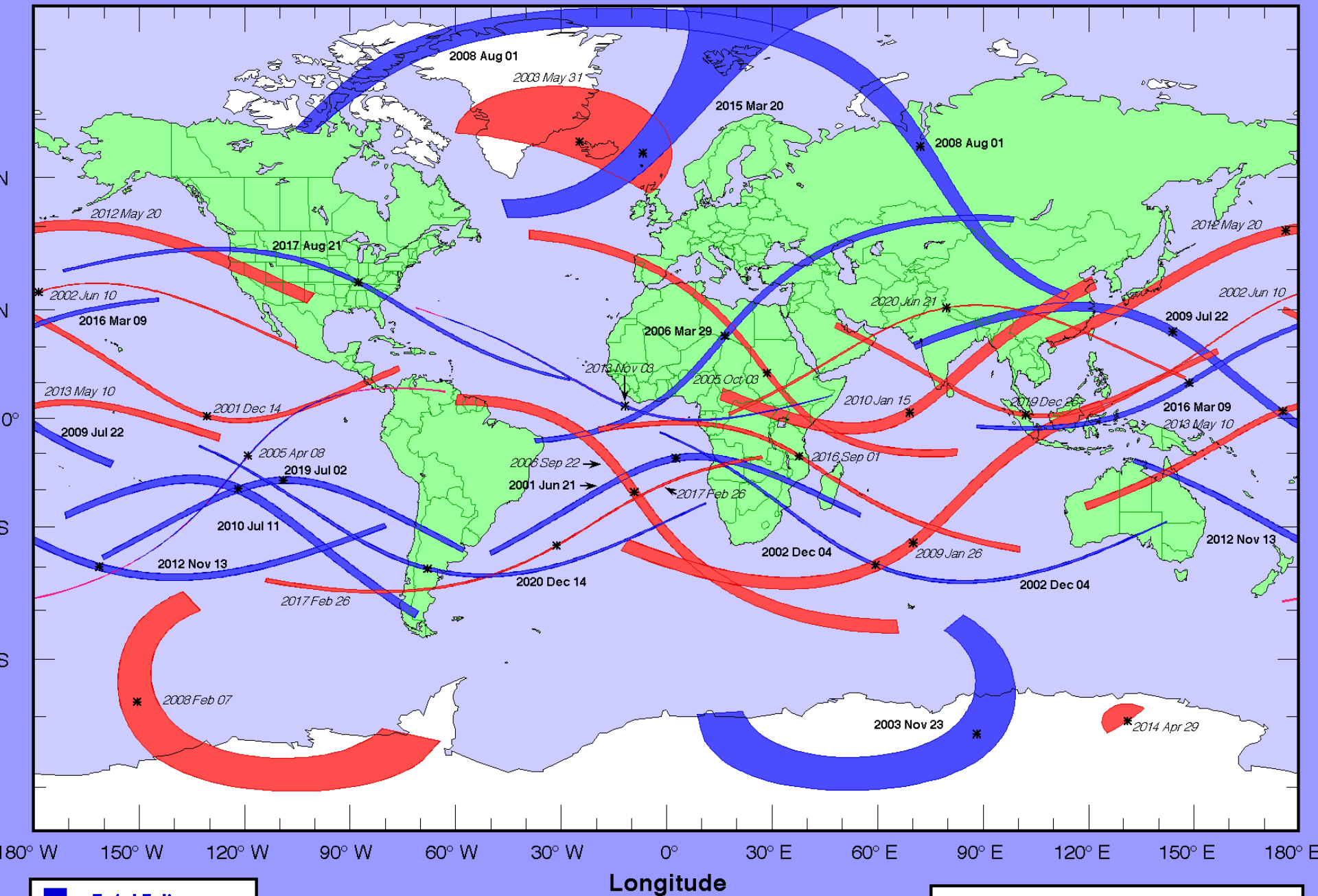


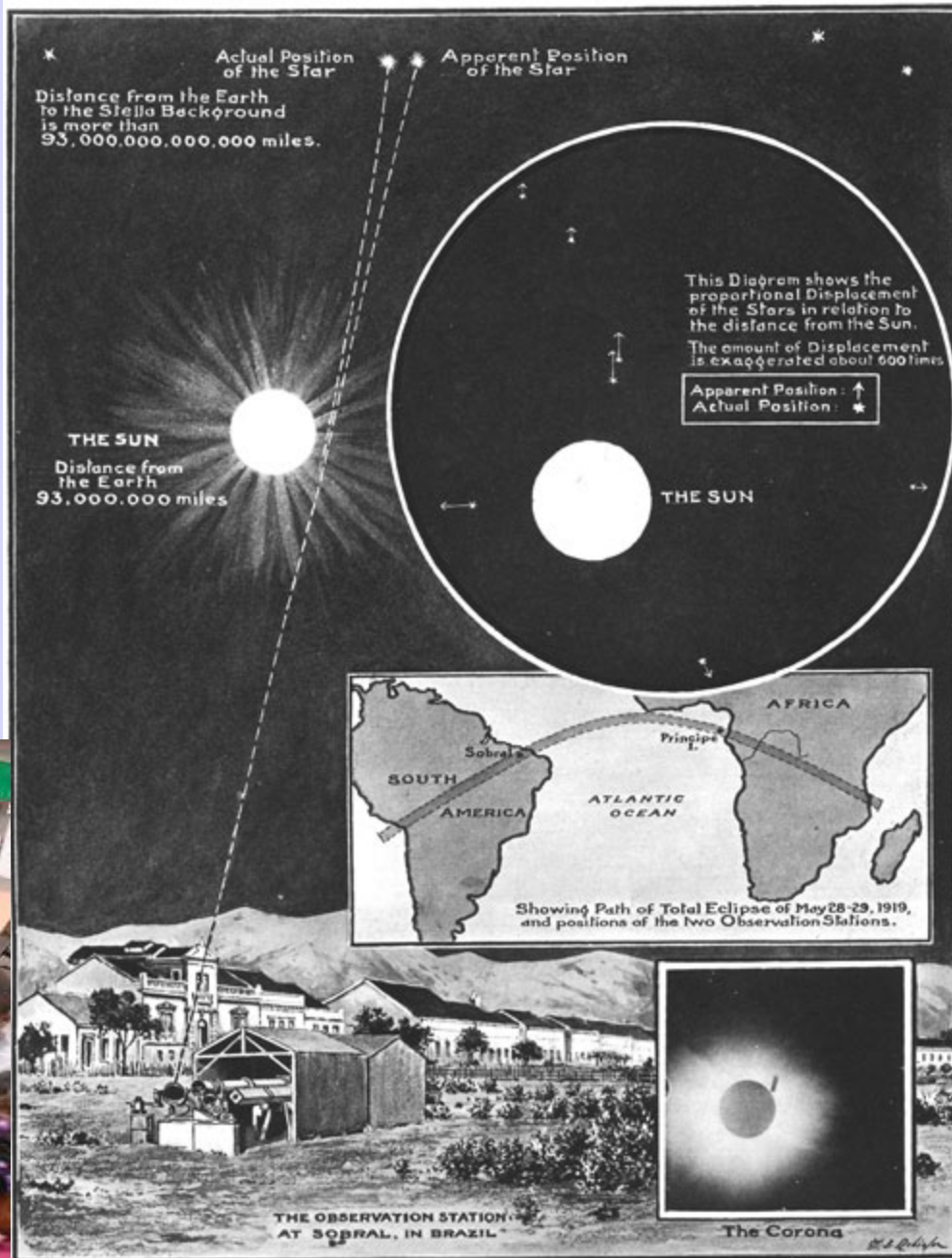
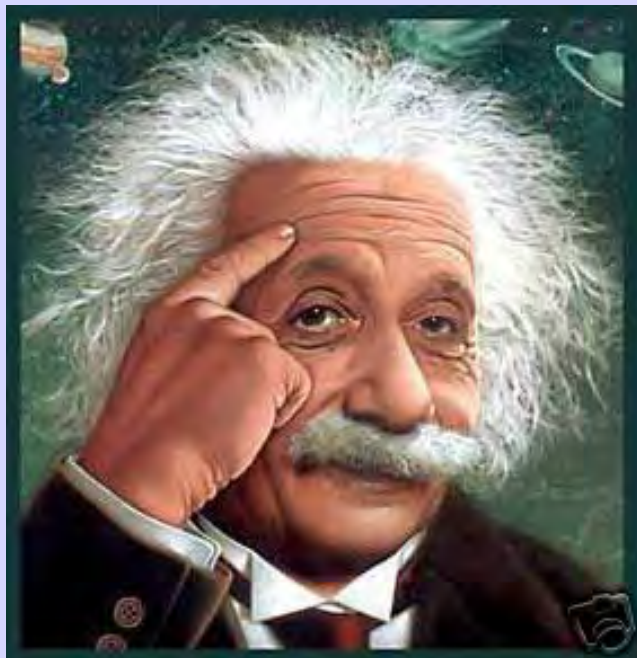
a The three types of solar eclipse. The diagrams show the Moon's shadow falling on Earth; note the dark central umbra surrounded by the much lighter penumbra.

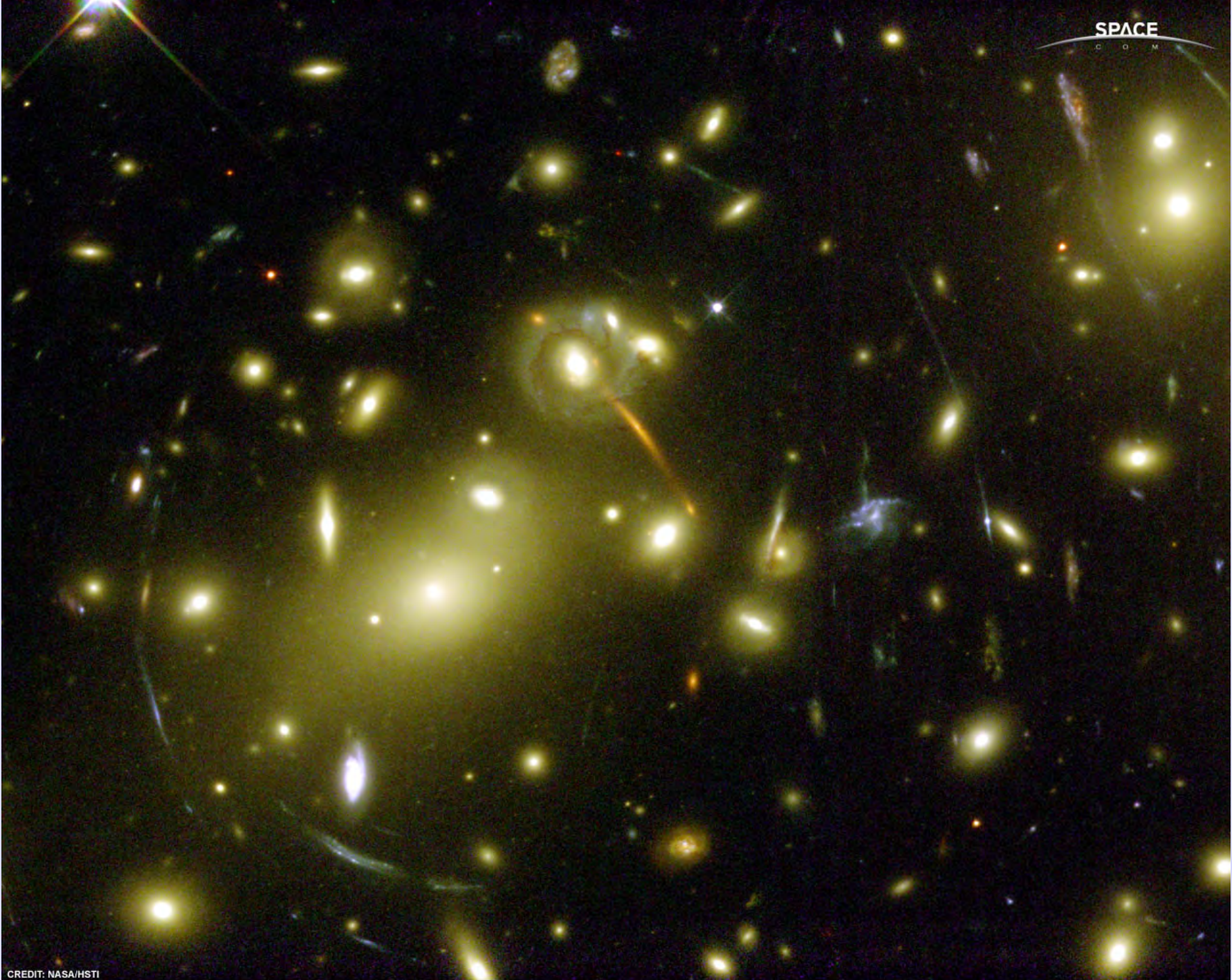
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Total and Annular Solar Eclipse Paths: 2001 – 2020

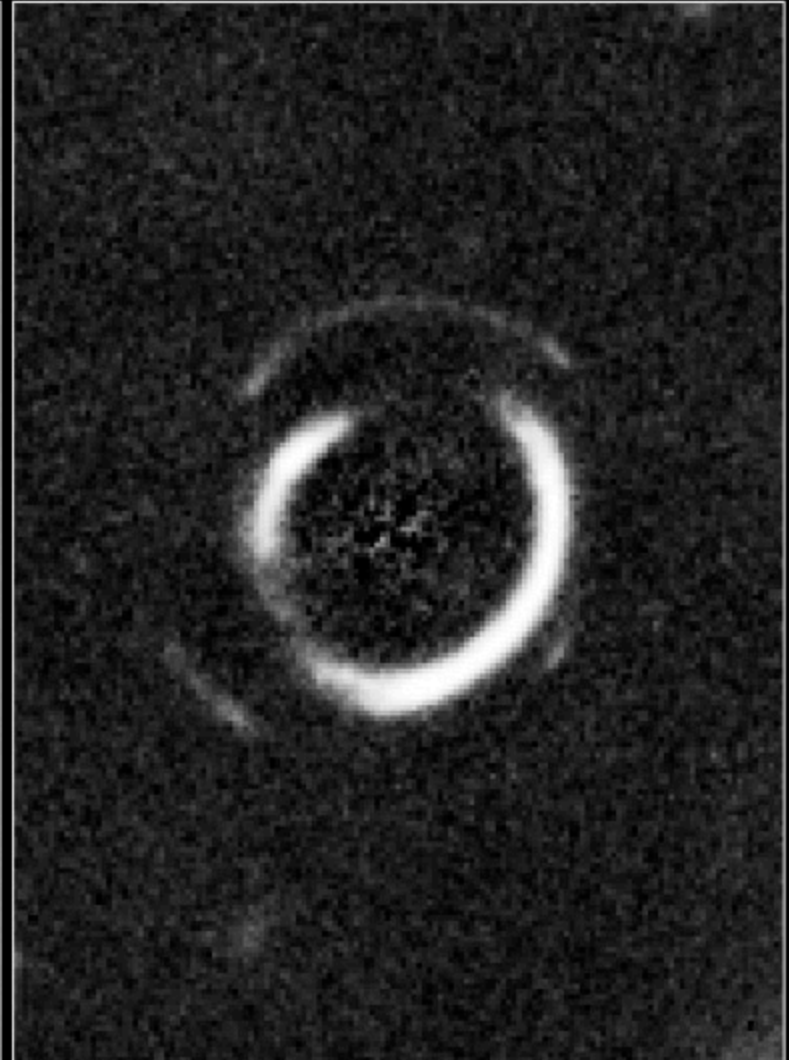
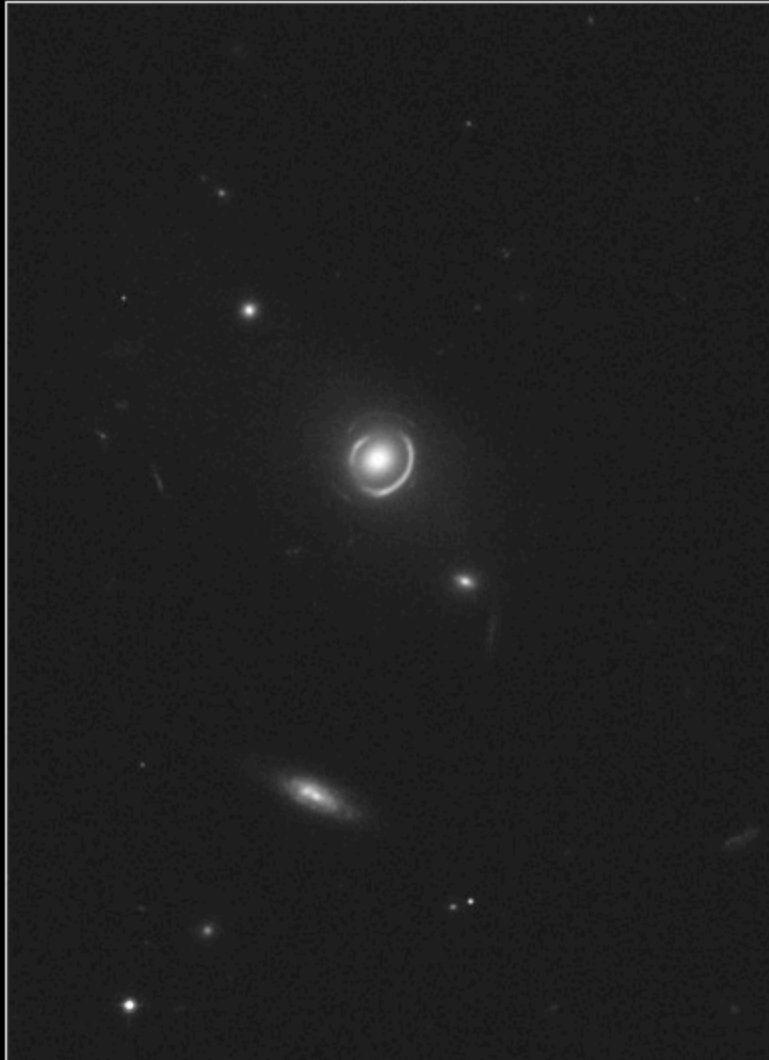






Double Einstein Ring SDSSJ0946+1006

Hubble Space Telescope ■ ACS/WFC



NASA, ESA, R. Gavazzi and T. Treu (University of California, Santa Barbara),
and the SLACS Team

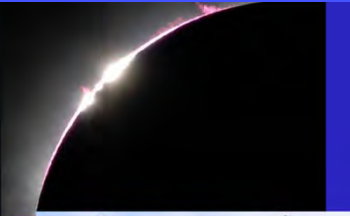
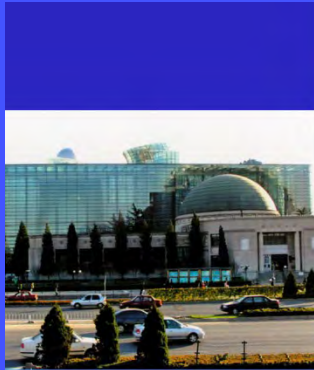
STScI-PRC08-04

Today...eclipses are mostly for fun! (we study the sun from space)















[show video](#)

Solar Eclipses



Dr. Bruce Campbell





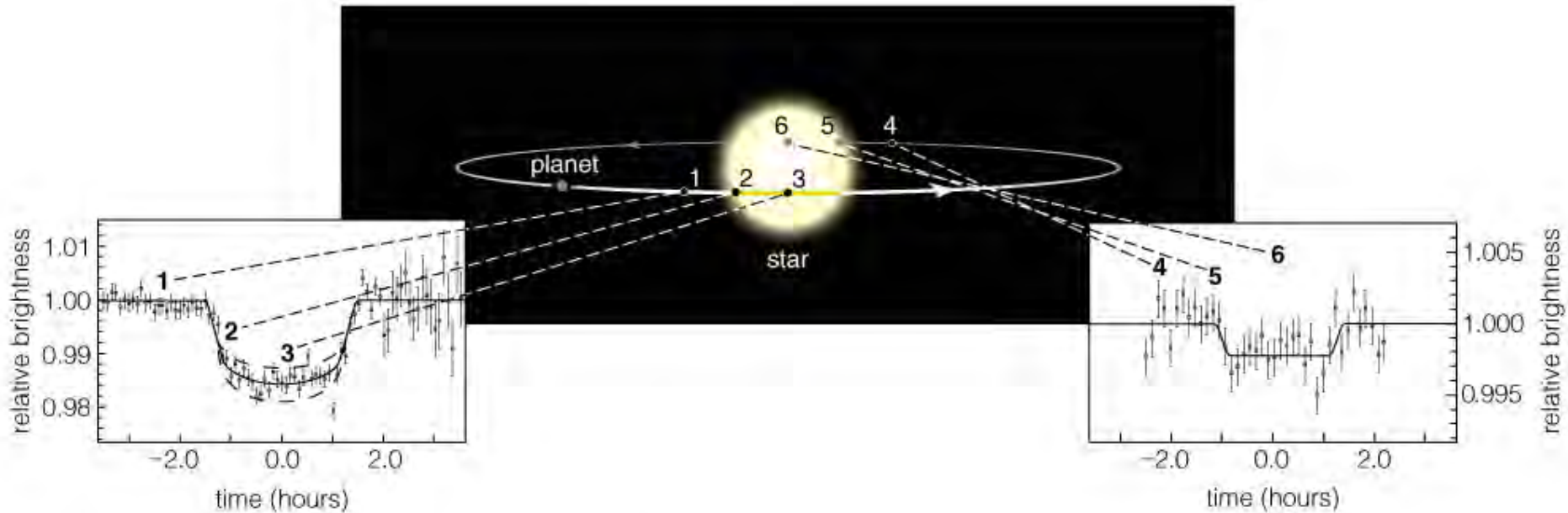
What will we see May 20?



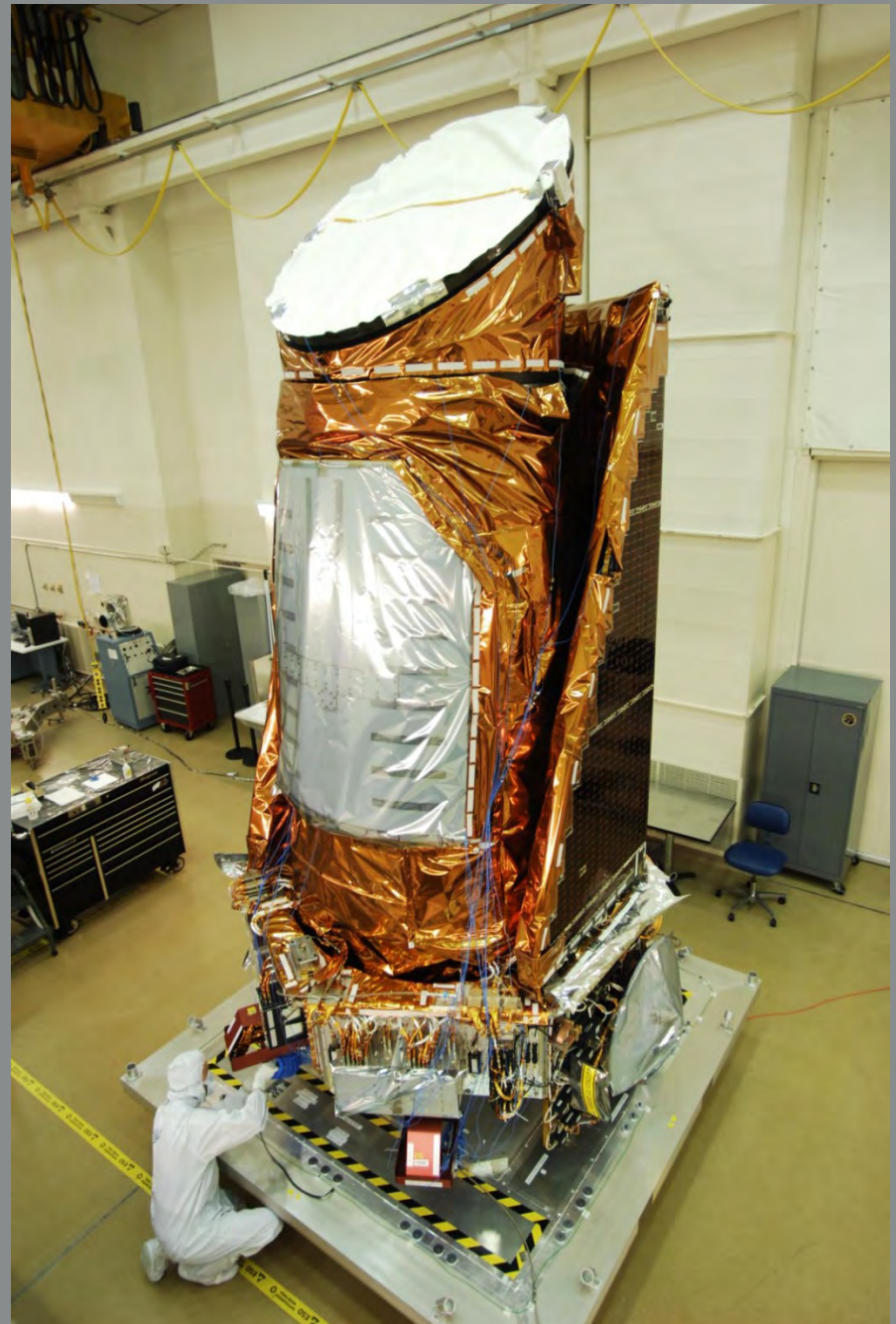
June 5, 2012



Transit Technique

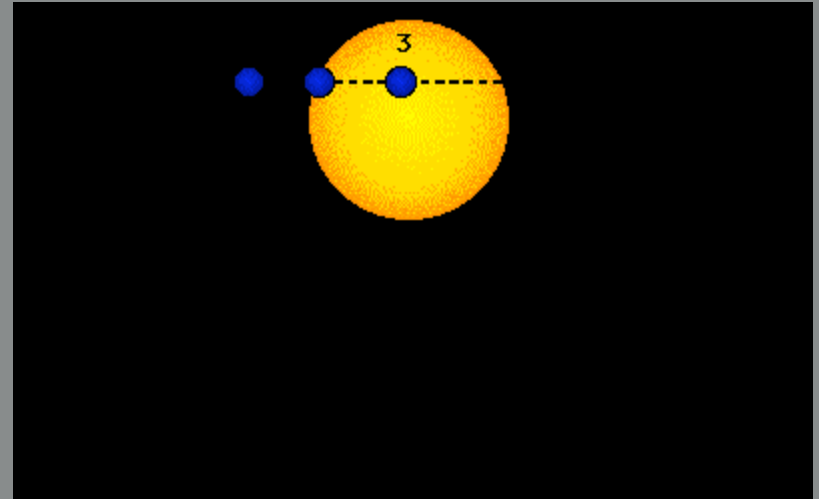


- A transit is when a planet crosses *in front of* a star (or eclipse when behind)
- Reduction in the star's apparent brightness tells us planet's radius
- Period of dips tells us the planet's distance
- Mass can be learned from Doppler technique
- Mass & Volume (from radius) tells us **DENSITY**

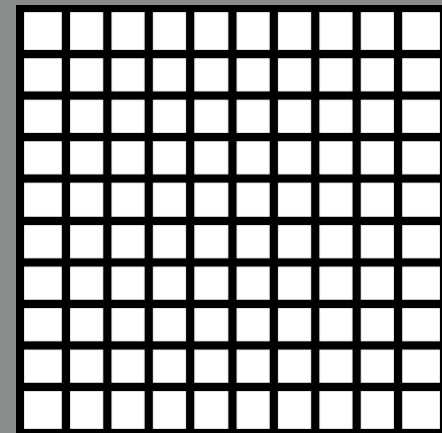


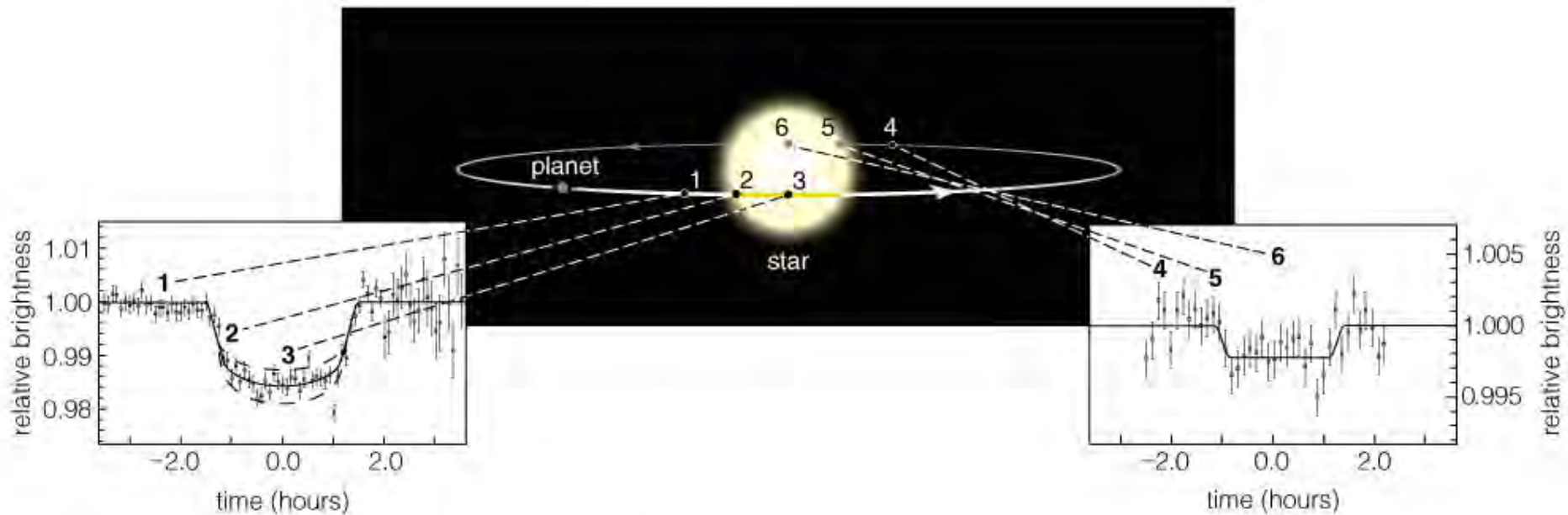
If a planet is $1/10$ the size (radius) of a star, what fraction of the light would it block?

$1/100$ of the light!

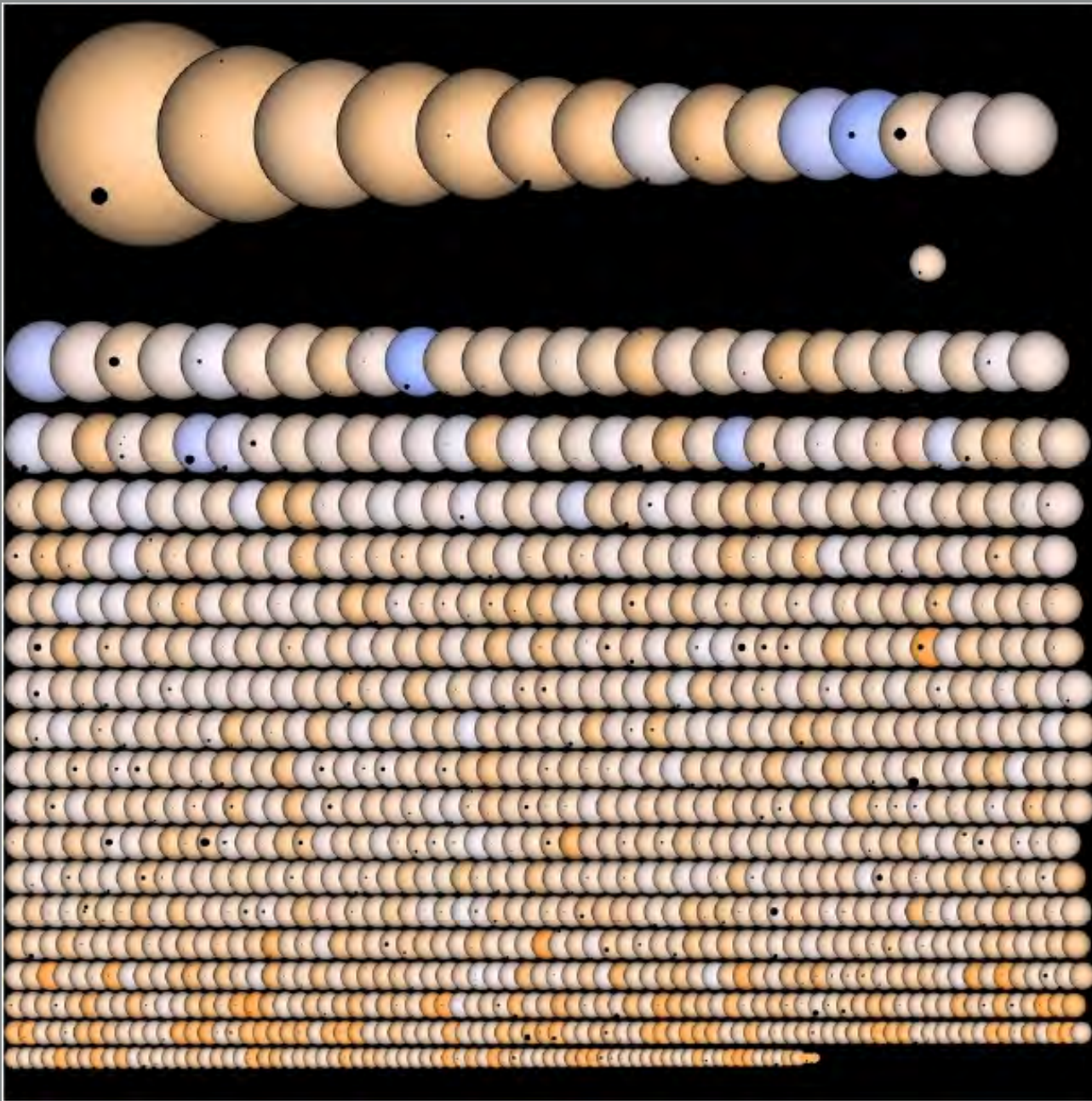


Earth is $1/100$ radius of sun
so it blocks .0001 of the light





Kepler has found...



over 1000
planet
candidates!

June 5, 2012!

Transit of Venus



The End
(Dec. 21, 2012?)

7 minutes of video are at MyDocuments/TRIPS/EclipseVideo/
Video_TS