



NASA'S UNIVERSE OF LEARNING

Big Stories in Astrophysics
February 15, 2019

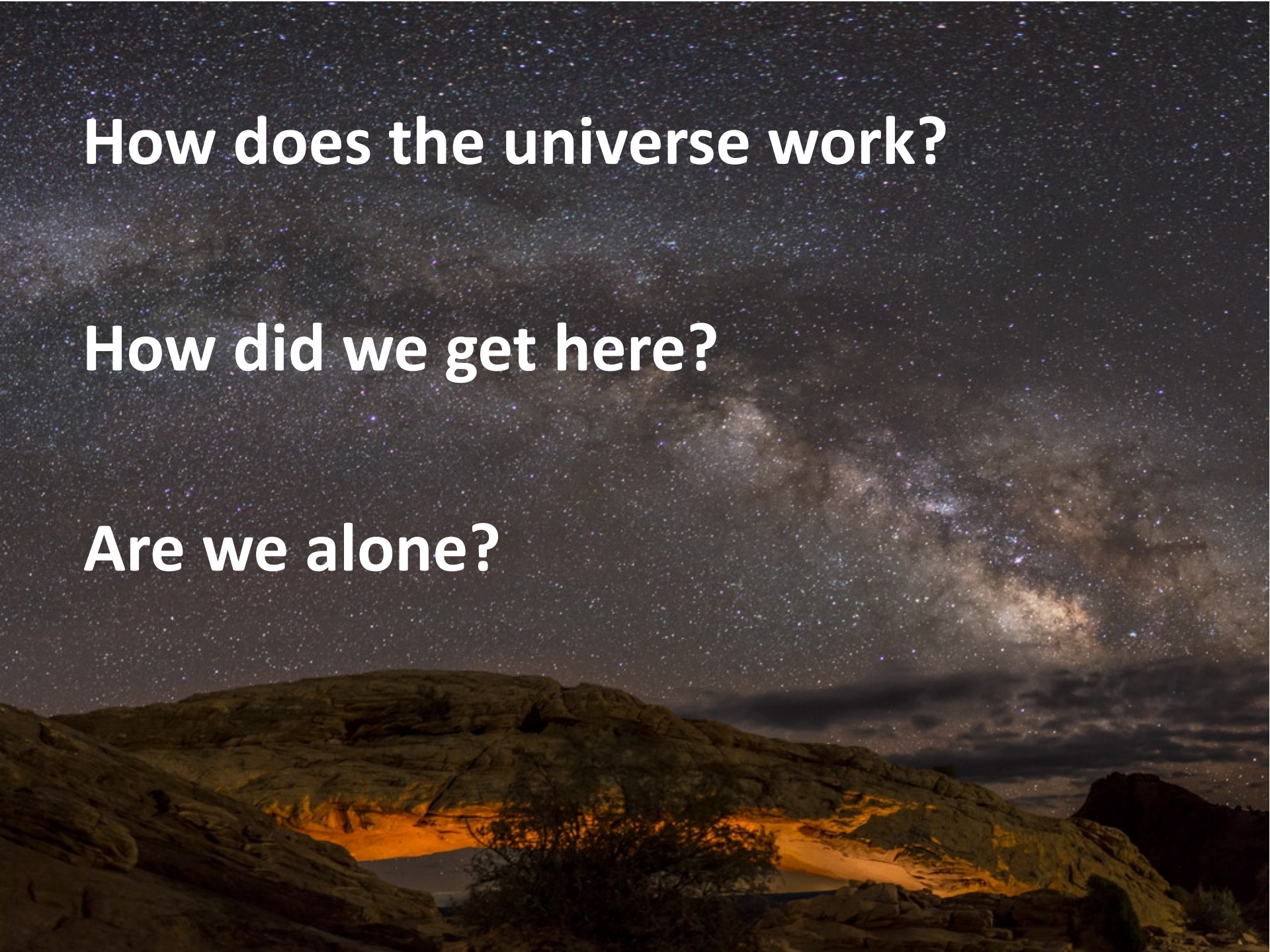
**Exploring the Universe Beyond
the Solar System with NASA**

**Dr. Denise Smith
(NASA's Universe of Learning/STScI)**

How does the universe work?

How did we get here?

Are we alone?





Spitzer
8/25/2003

Kepler
3/7/2009
10/30/2018 EOM

- Formulation
- Implementation
- Primary Ops
- Extended Ops

WFIRST
Mid 2020s

Webb
2021

Euclid (ESA)
2022

Chandra
7/23/1999

XMM-Newton (ESA)
12/10/1999

TESS
4/18/2018

Swift
11/20/2004

NuSTAR
6/13/2012

Fermi
6/11/2008

IXPE
2021

Hubble
4/24/1990

XRISM (XARM) (JAXA)
2022

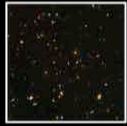
GUSTO
2021

ISS-NICER
6/3/2017

ISS-CREAM
8/14/2017

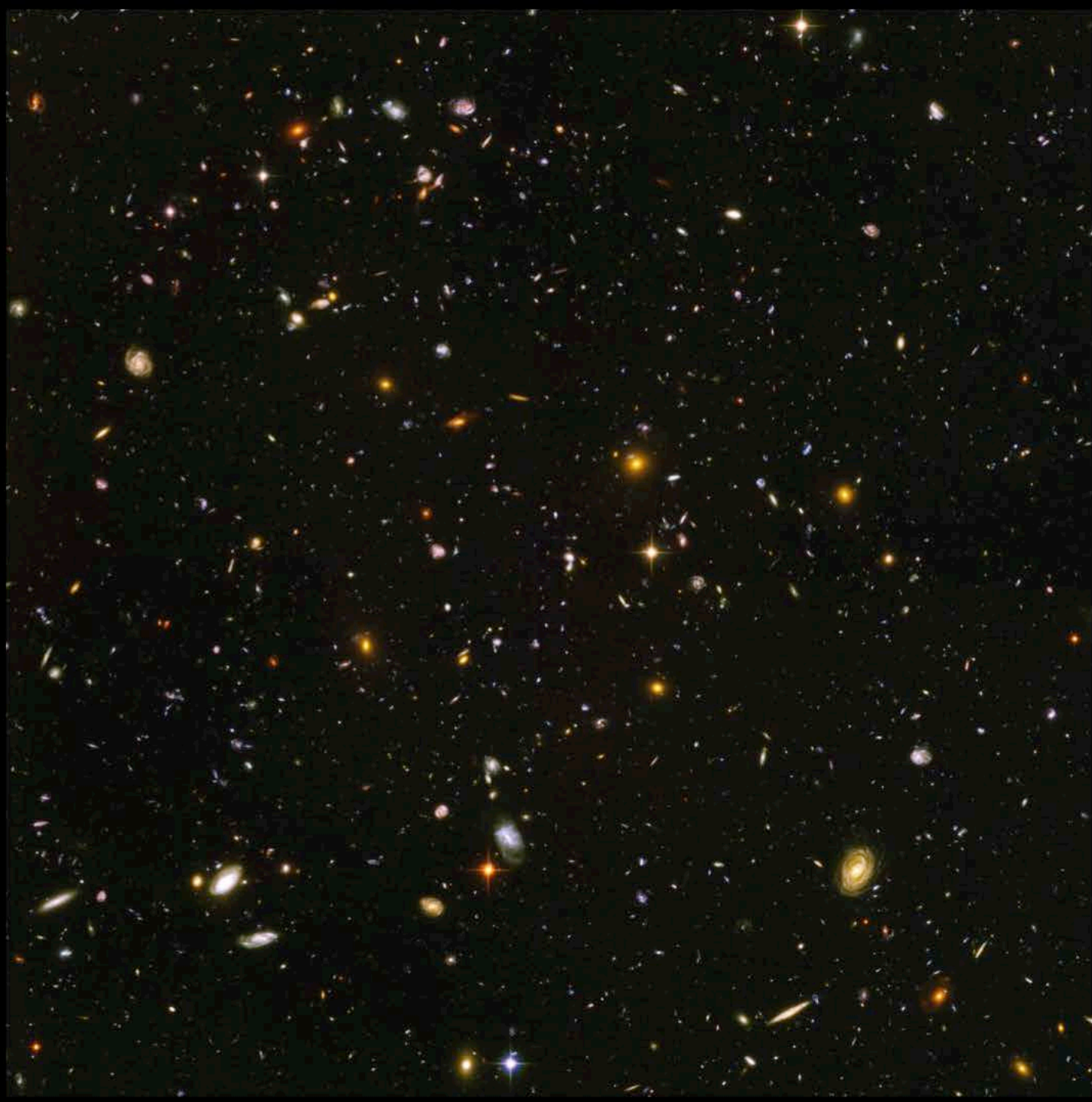
SOFIA
Full Ops 5/2014

Revised
November 27, 2018
Consistent with FY18 Appropriation



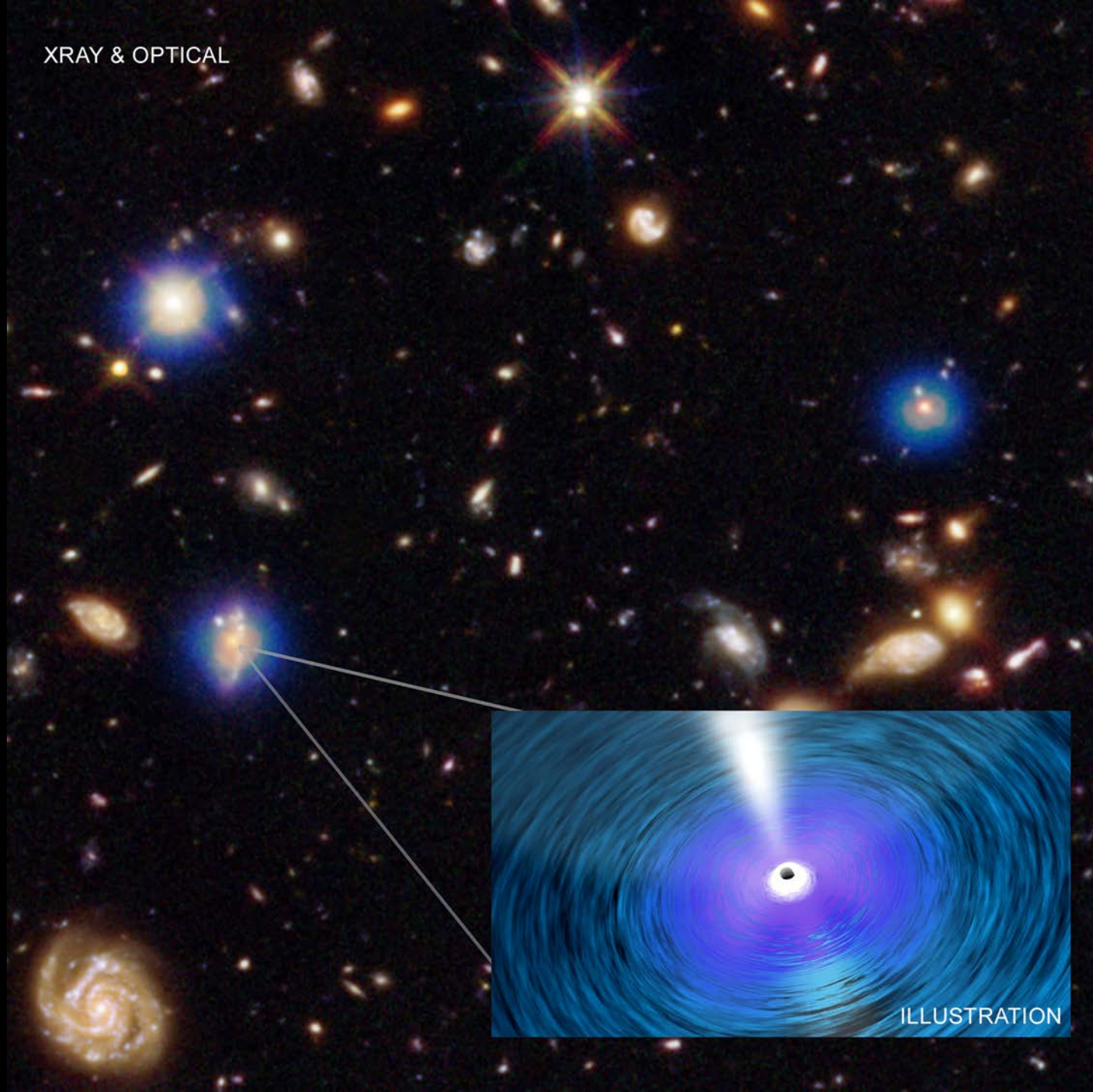
Hubble Ultra
Deep Field







XRAY & OPTICAL



ILLUSTRATION

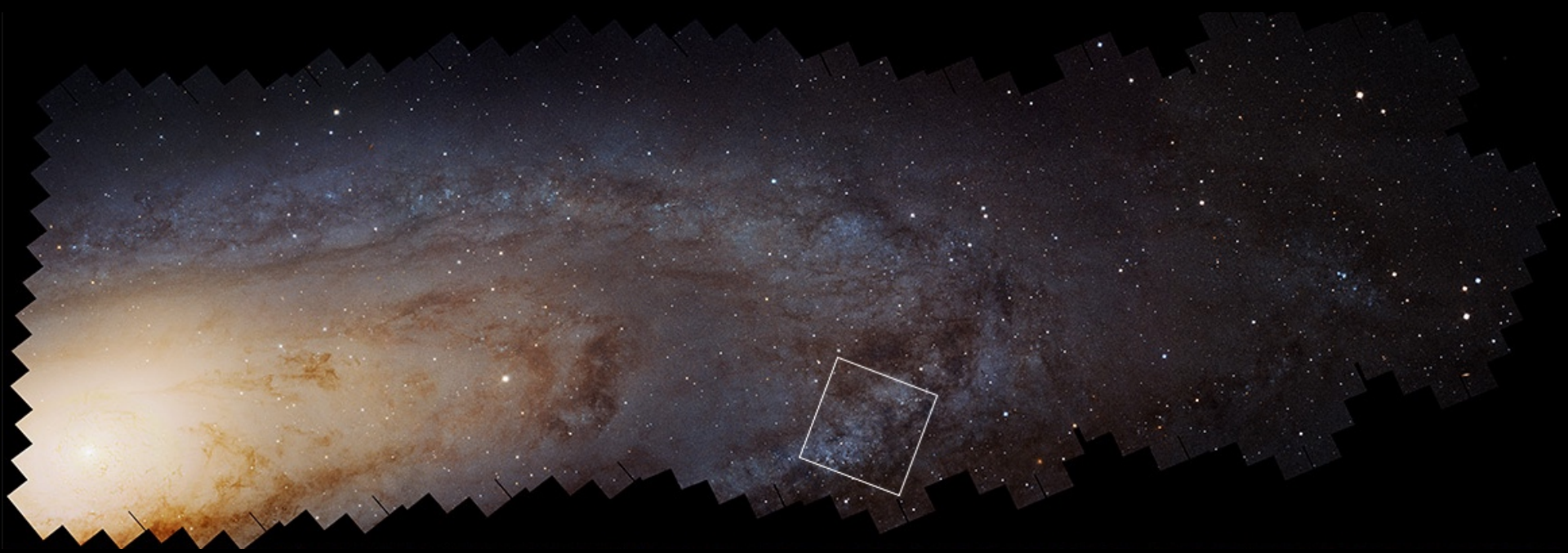


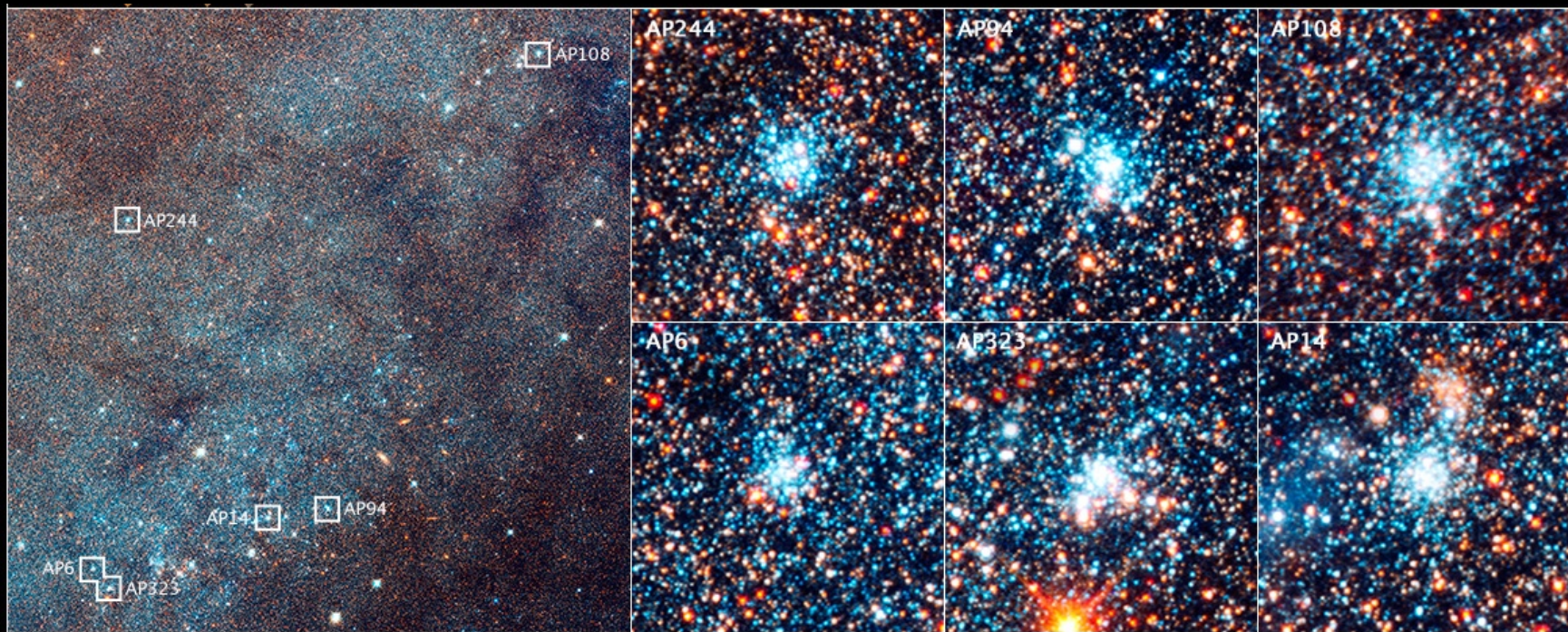
M31

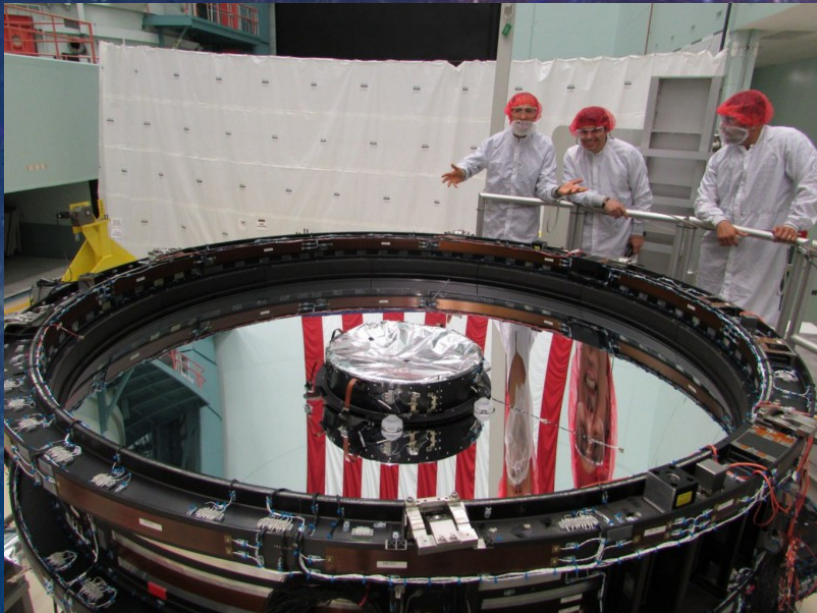
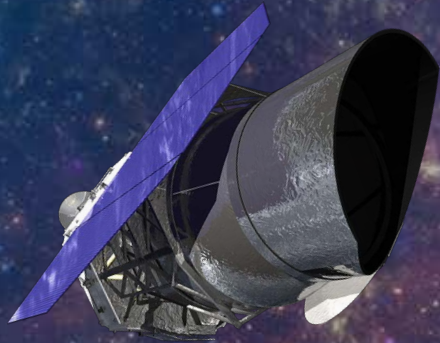


HST
PHAT

DSS and R. Gendler









HUBBLE

WFIRST

Visible



Visible light shows older, yellower stars near the center,
and younger, bluer stars along the spiral arms.

▶ ▶| 🔊 0:42 / 3:05

🔍 📺 🖥️ 🗄️

Shedding New Light on the Whirlpool Galaxy

<http://hubblesite.org/video/1195/science>

VIEWSPACE

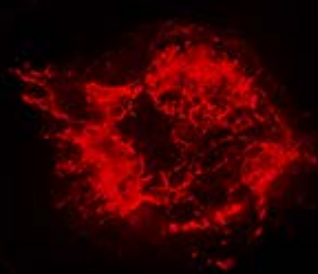
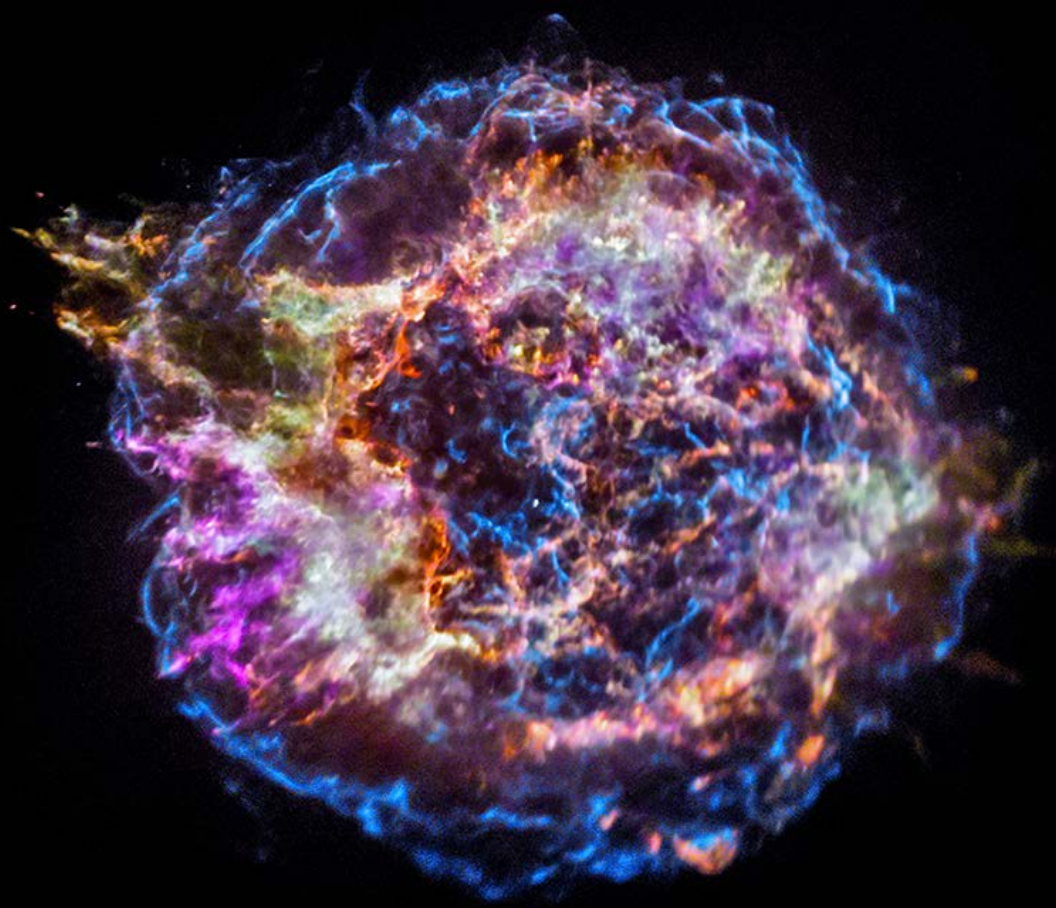
EXPLORE THE UNIVERSE WITH INTERACTIVES AND VIDEOS



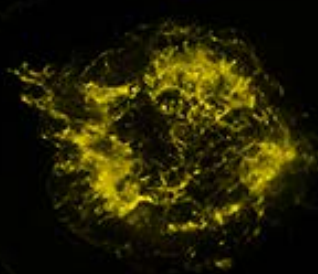
INTERACTIVES

VIDEOS

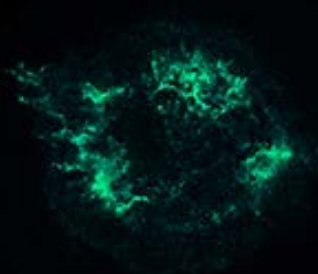
<https://viewspace.org/>



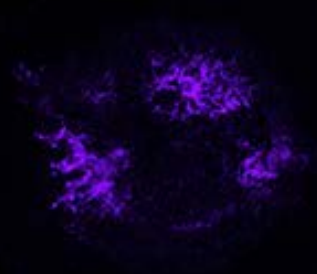
SILICON



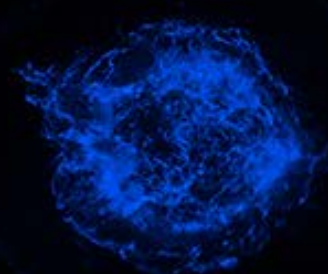
SULFUR



CALCIUM

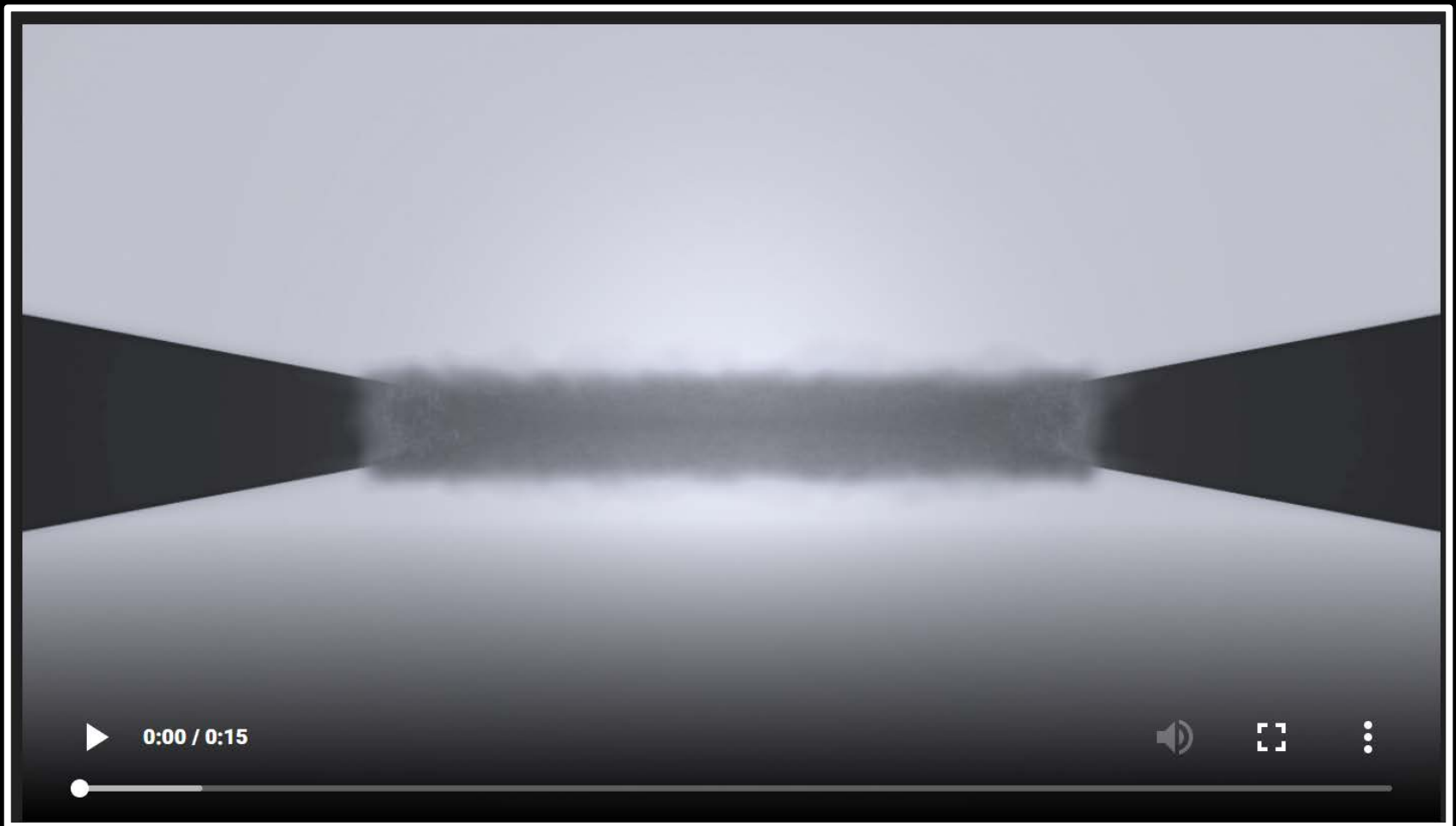


IRON



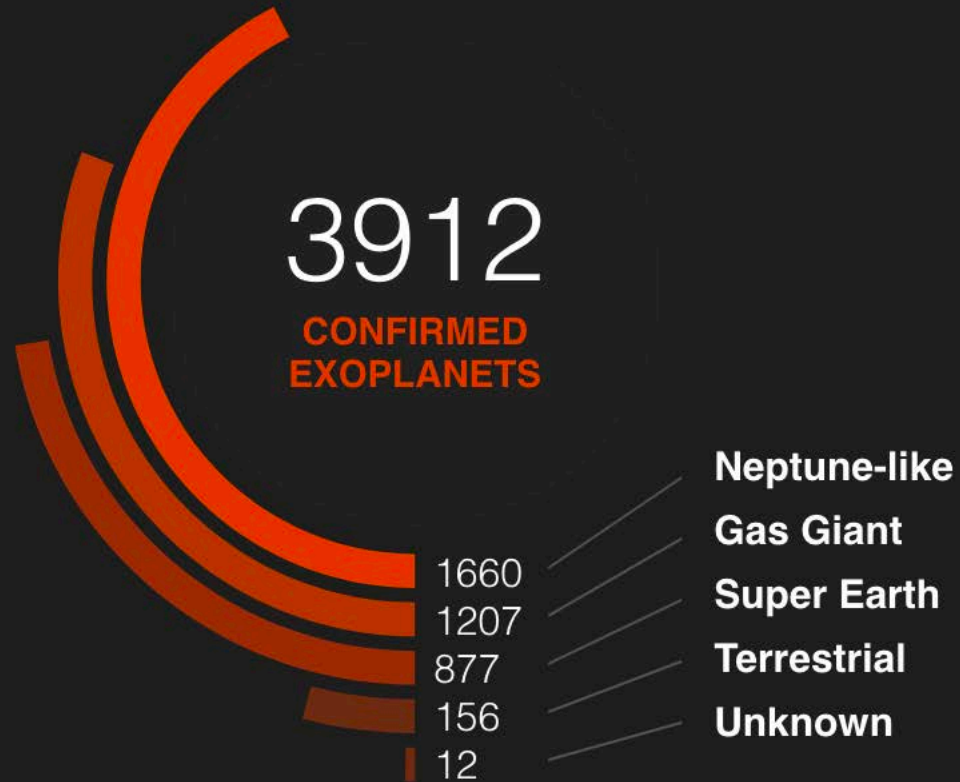
BLAST WAVE

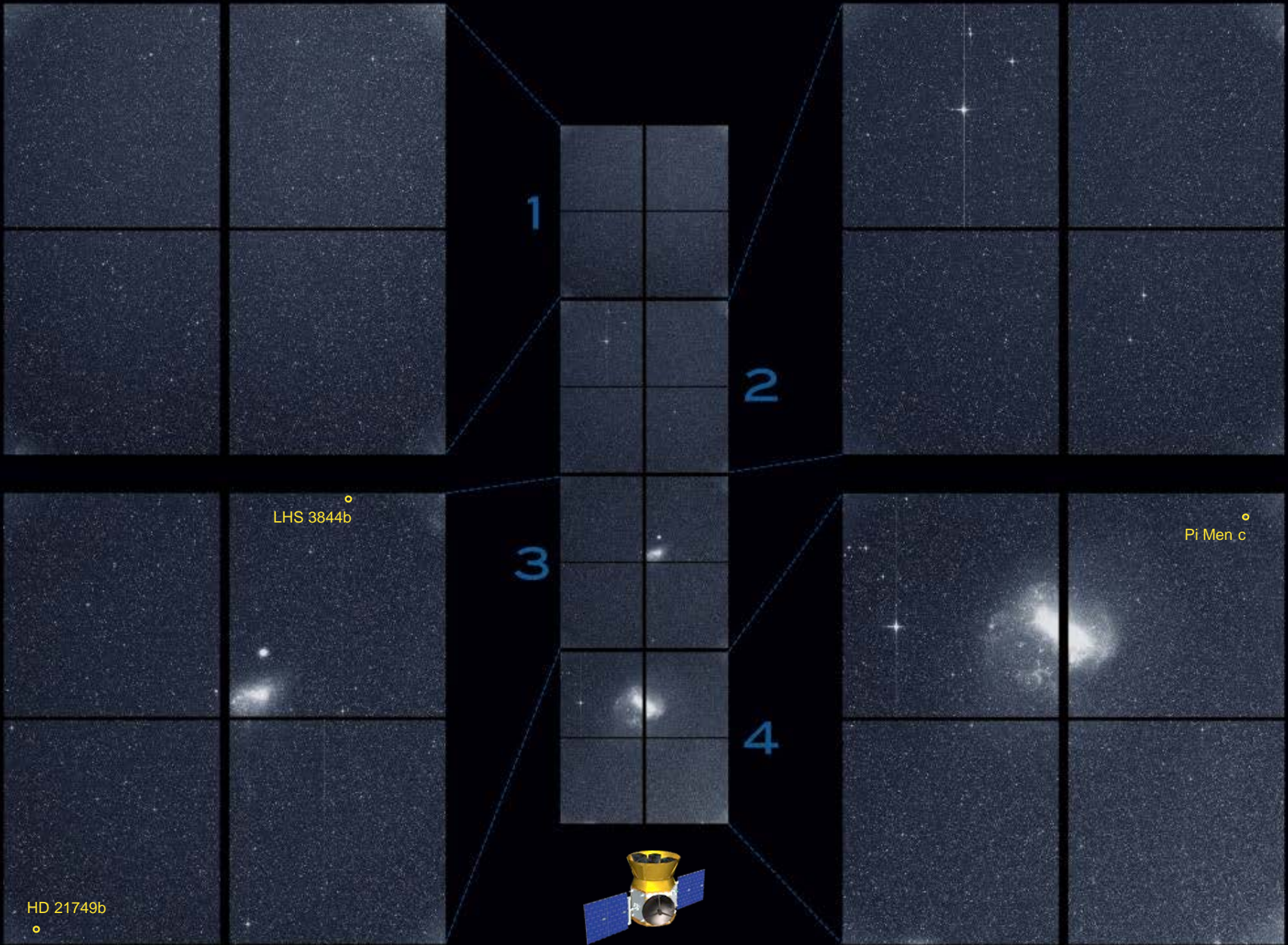




Video of an artist's model of the circumstellar disk
http://hubblesite.org/video/1184/news_release/2018-40

Planet Types





1

2

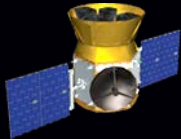
3

4

LHS 3844b

Pi Men c

HD 21749b



LHS 3844b



Pi Mensae c



1

2

LHS 3844b

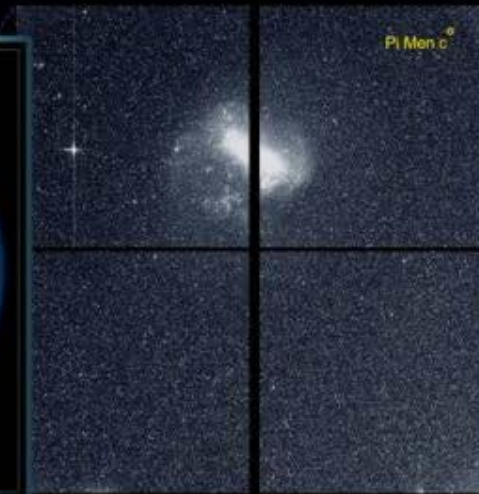


HD 21749b

HD 21749b



Pi Men c







<https://www.universe-of-learning.org/>

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