

Jingle bell rock

The 12 Astronomy Highlights of Christmas

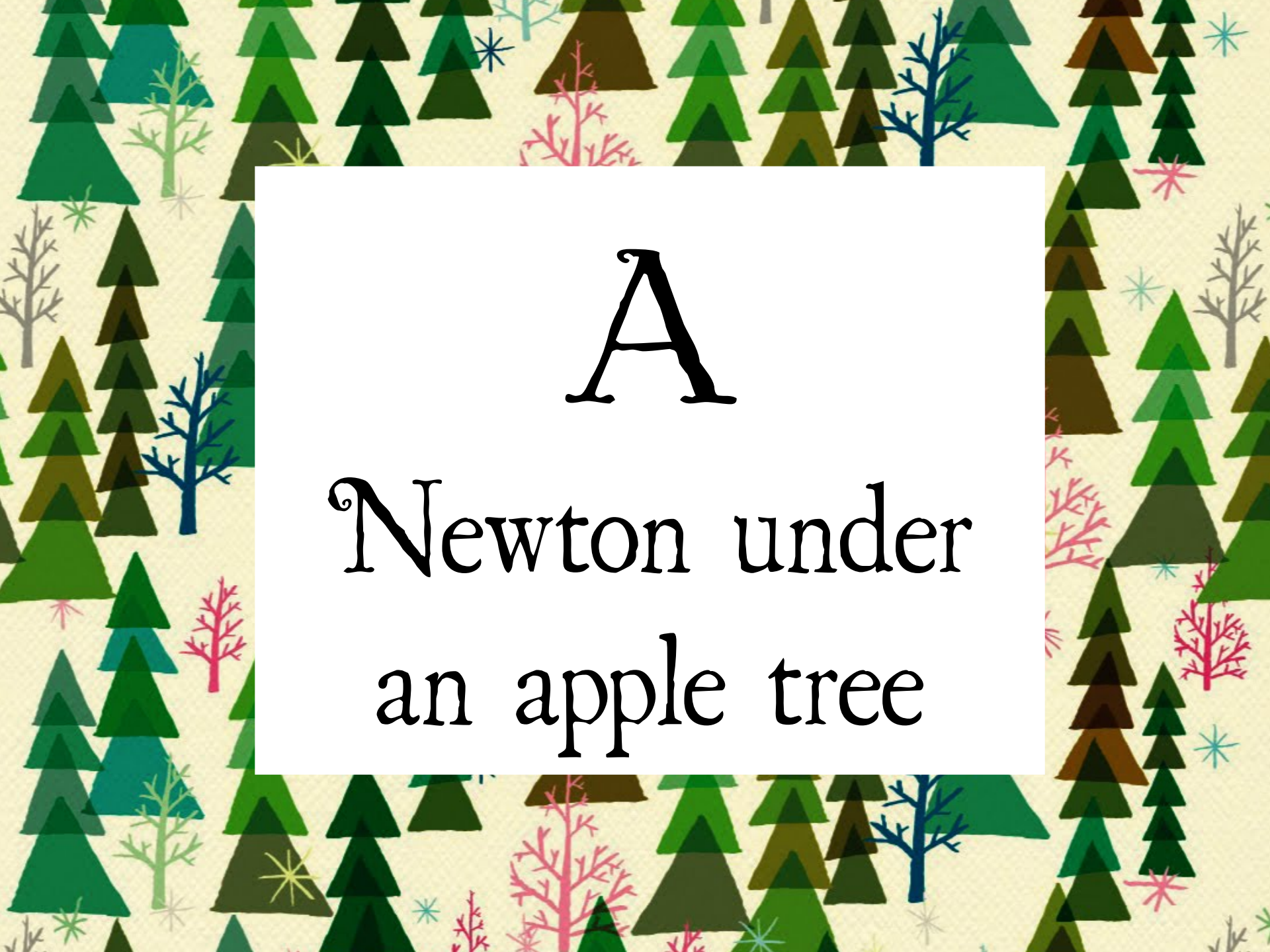
Christopher Berry, Keelia Scott &
Graham Smith



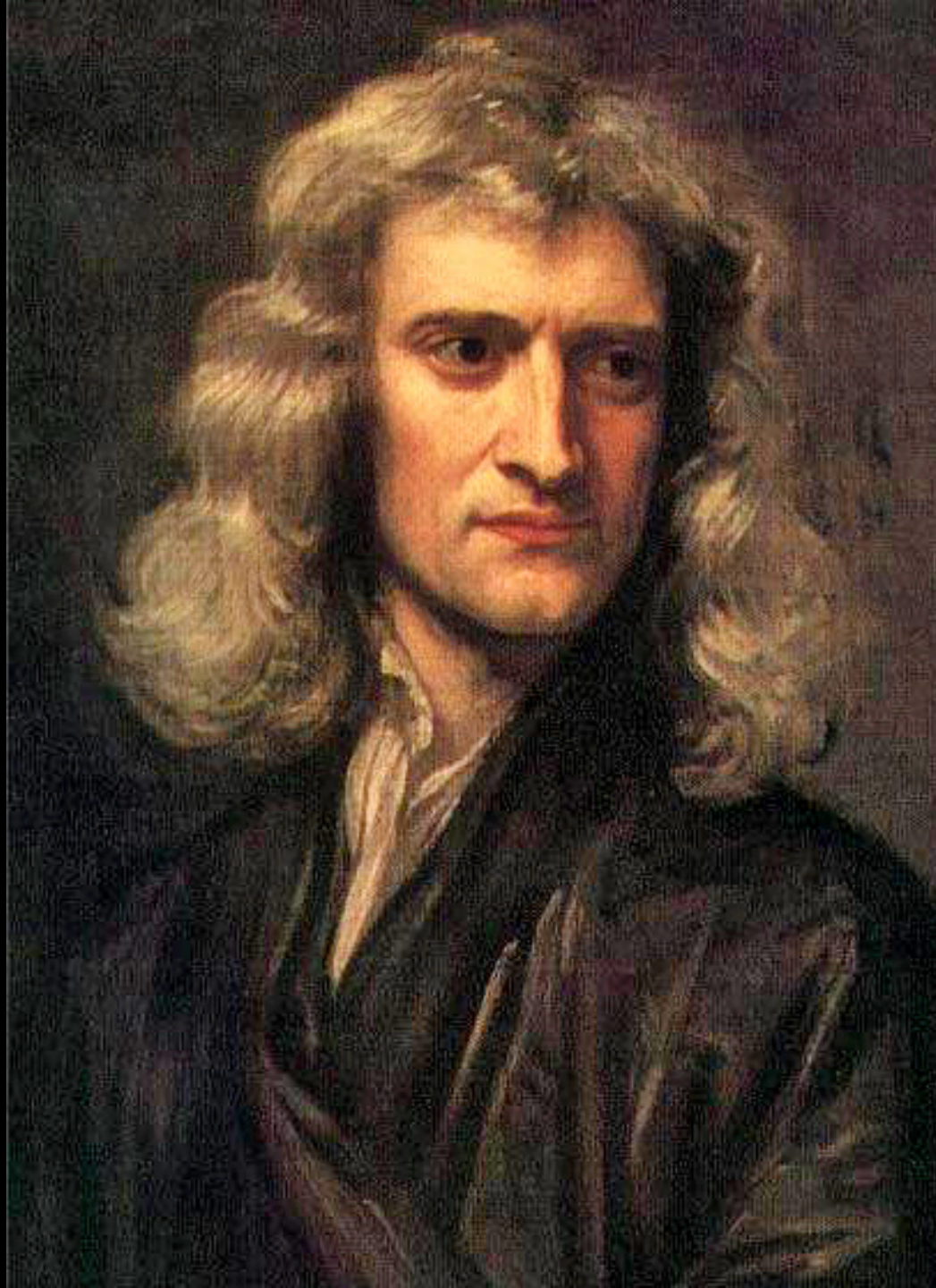
Credit:
SIRTF/NASA/ESA



On the n th day of Christmas an
Astronomer gave to me....



A
Newton under
an apple tree



Credit:
Gottfried Knelle/
Plymouth Estate

Credit:
Daniel Berehulak/
Getty Images

PHILOSOPHIAE
NATURALIS
PRINCIPIA
MATHEMATICA

JOHANNES KEPLER
Professore Mathematico
in Collegio Caesareo
Vindobonensi

MPRIMATUR
PYS, Reg. Soc. PR
Julii 5. 1686



Credit:
The Royal Society



2

clear nights
observing



Credit: University of
Birmingham Observatory



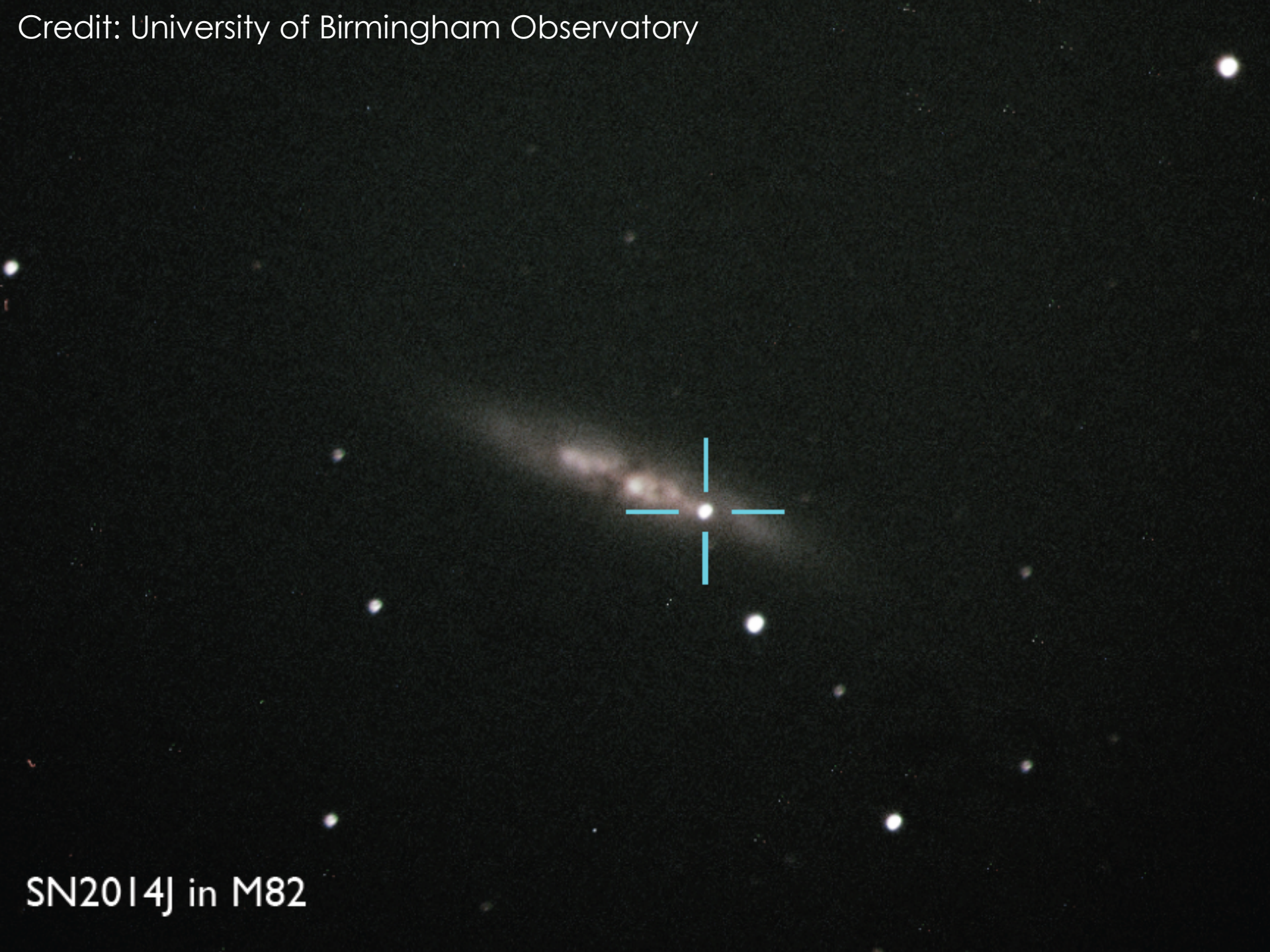


Credit:
University of
Birmingham
Observatory




Credit:
University of
Birmingham
Observatory

Credit: University of Birmingham Observatory

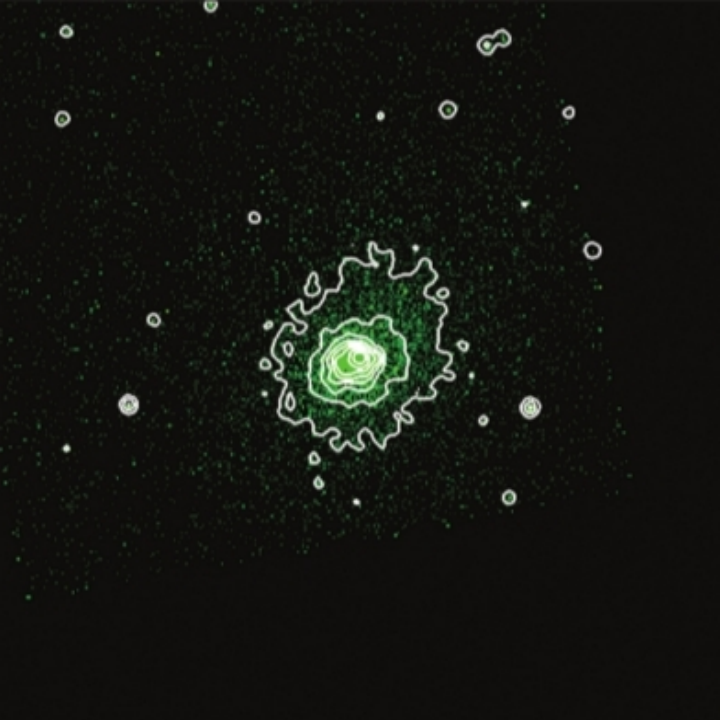
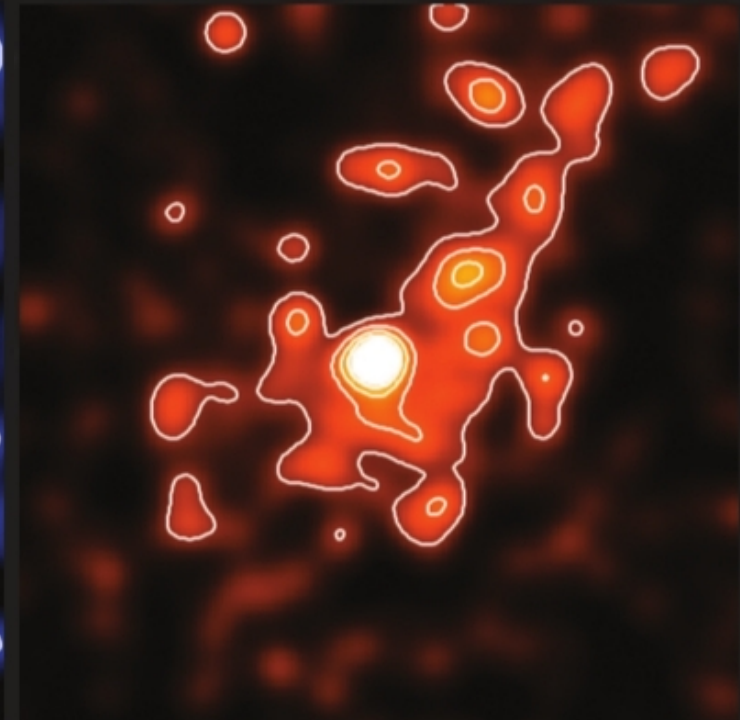
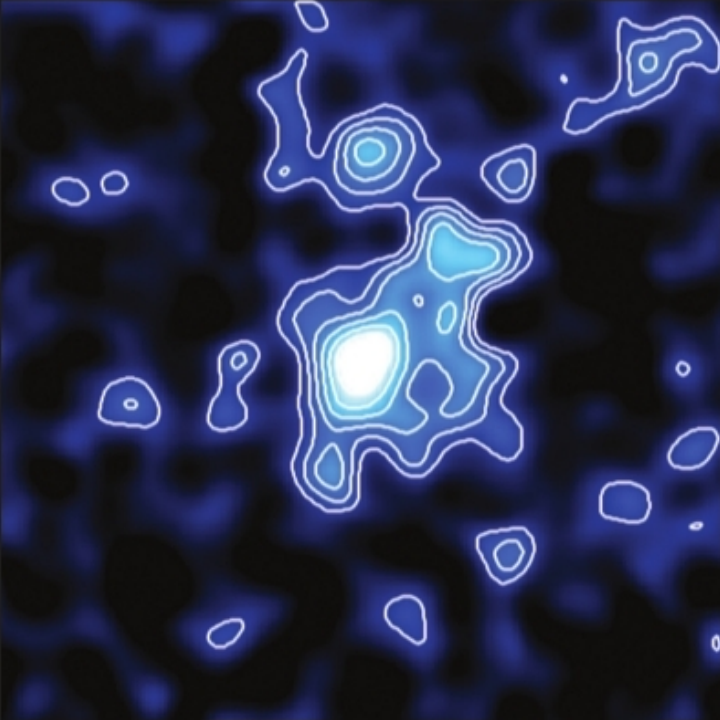


SN2014J in M82

The background of the slide is a repeating, ornate floral pattern in shades of gold and brown. The pattern consists of stylized leaves, scrolls, and floral motifs arranged in a symmetrical, repeating grid.

3

components of a
cluster



Credit:
Subaru/UKIRT/
Chandra/
University of
Birmingham/
Nordic Optical
Telescope/
University of
Hawaii

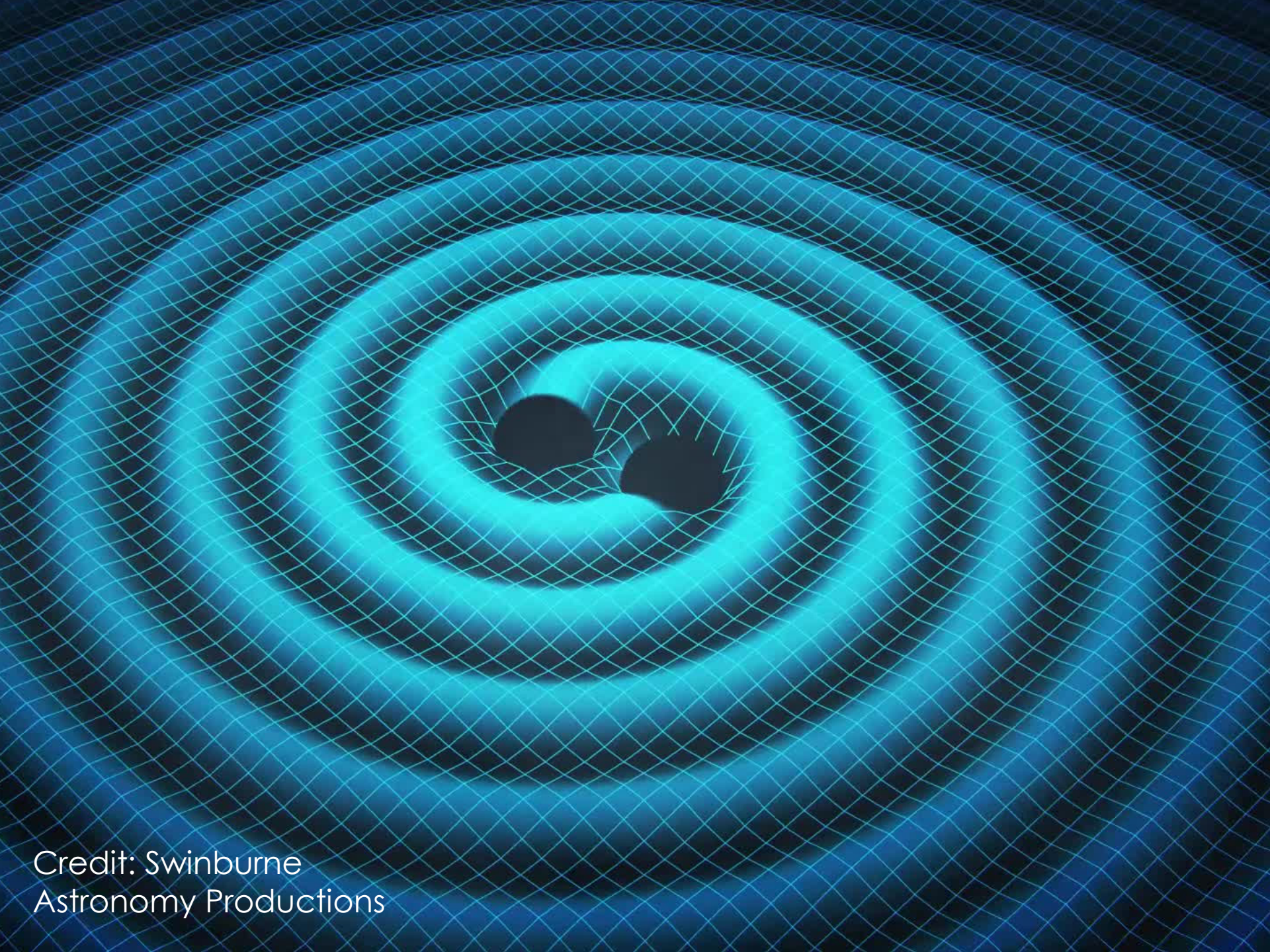


4 km

long laser arms



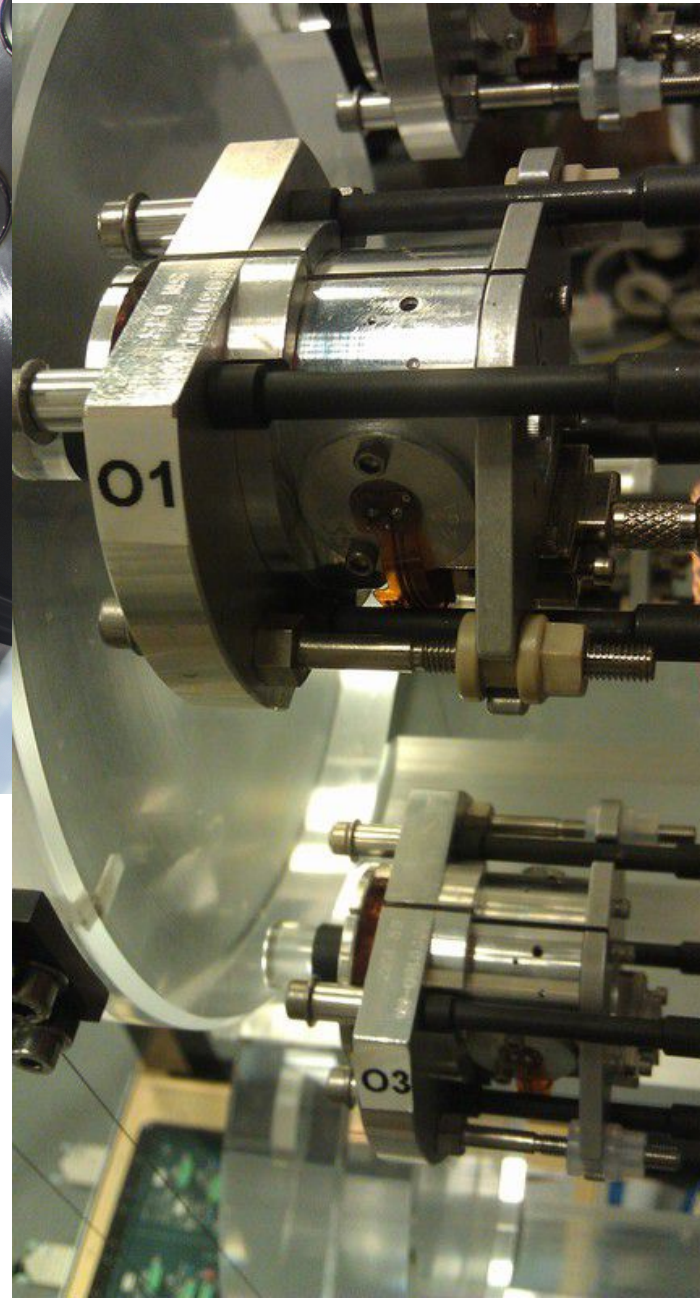
Credit:
LIGO Livingston



Credit: Swinburne
Astronomy Productions



Credit: Michael Fyffe/LIGO Livingston



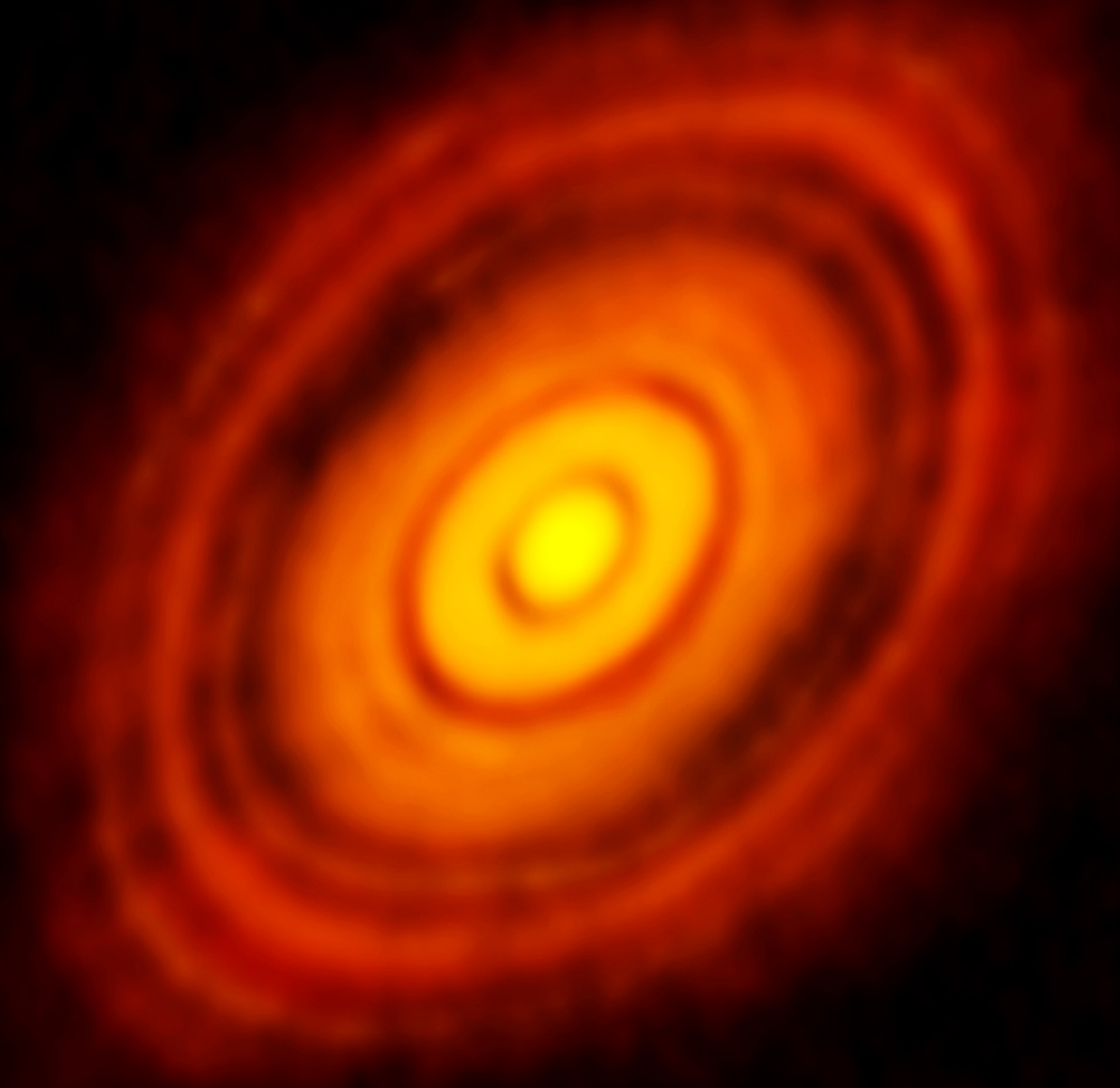
Credit: Andreas Freise/
University of Birmingham




5 (or more)

planet-forming rings!

Credit: C. Brogan, B. Saxton/ALMA





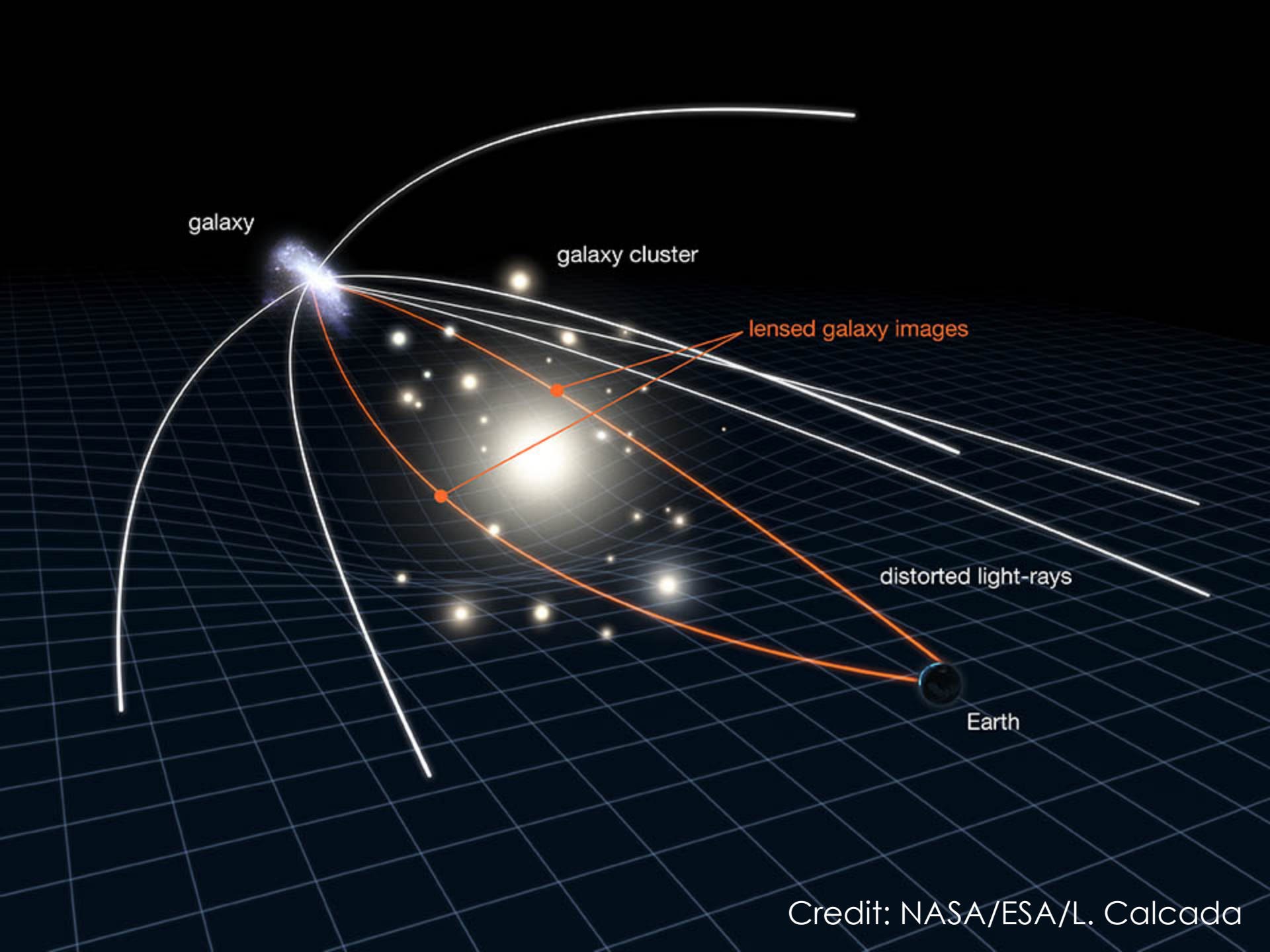
6

Frontier Fields

Pushing the limits
of the Hubble Space Telescope



Credit: NASA/Frontier Fields



galaxy

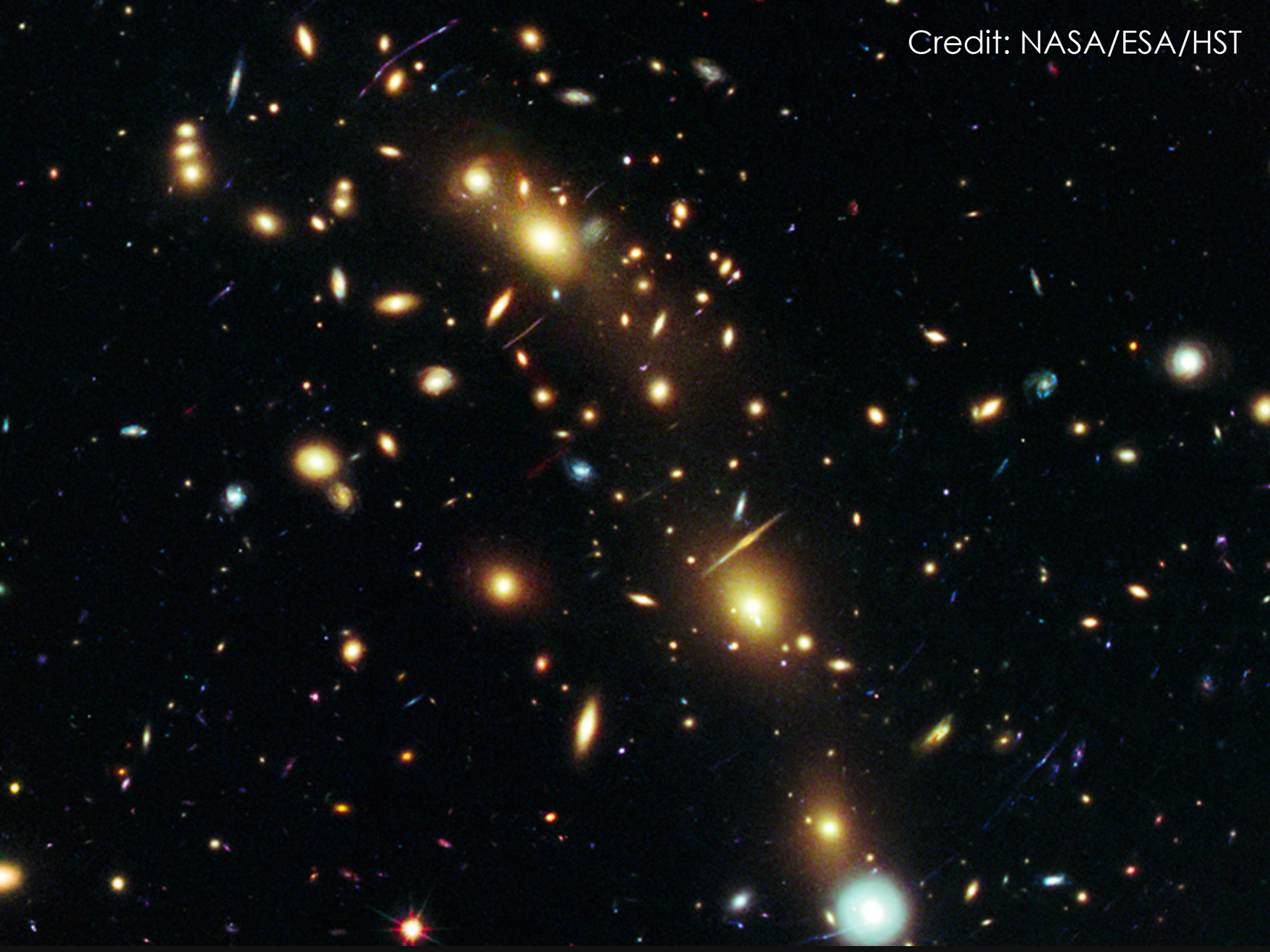
galaxy cluster

lensed galaxy images

distorted light-rays

Earth

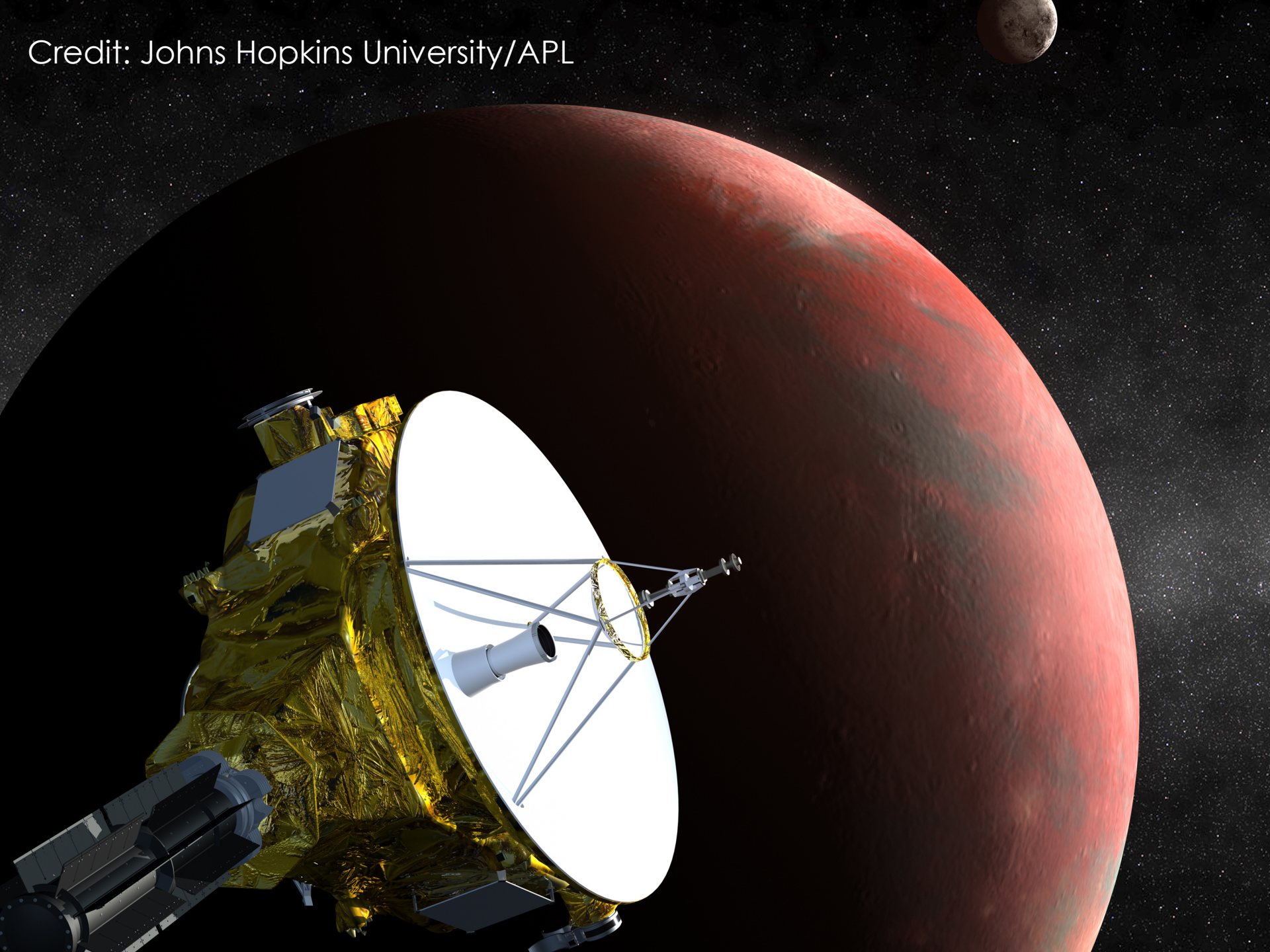
Credit: NASA/ESA/HST





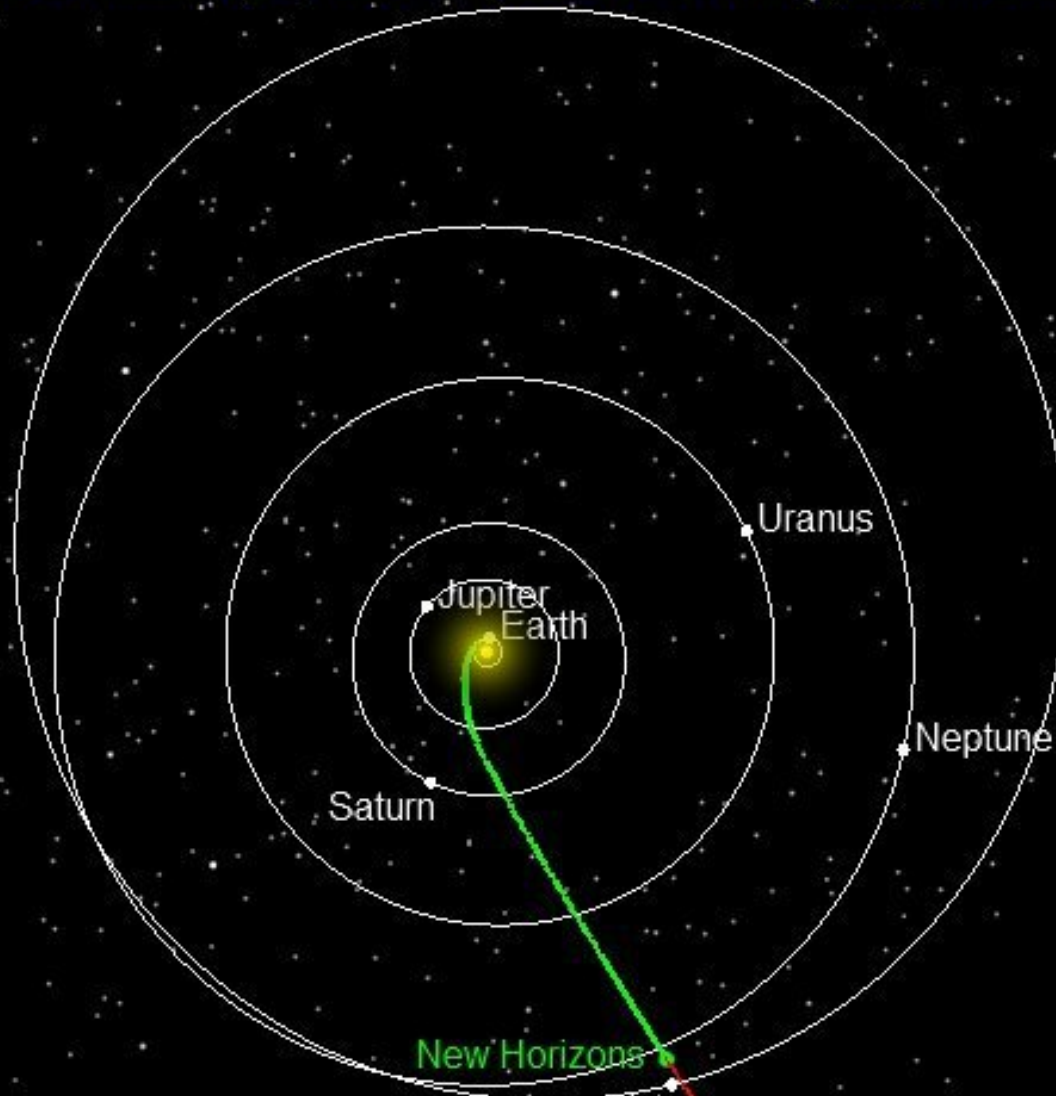
F months
until New
Horizons

Credit: Johns Hopkins University/APL



New Horizons Full Trajectory - Overhead View

Distance from Sun (AU): 31.05 Heliocentric Velocity (km/s): 14.64



Distance from Earth (AU): 31.88

Distance from Pluto (AU): 1.78

Round-Trip Light Time (hh:mm:ss): 08:50:20

3 Dec 2014 09:00:00 UTC

Credit:
NASA



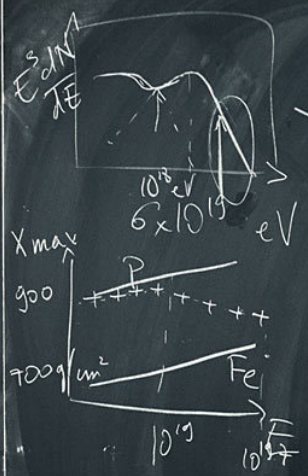
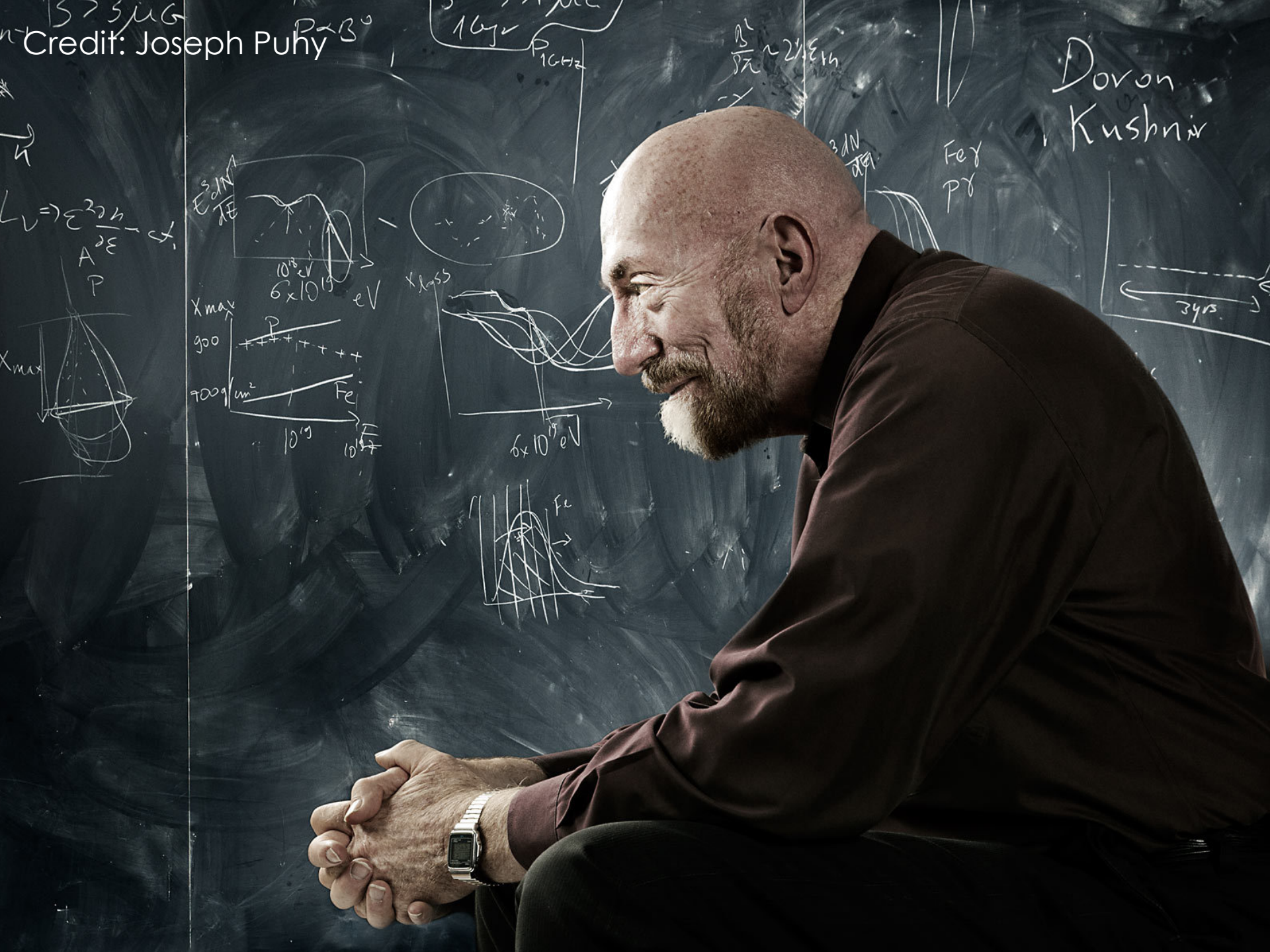
800 TB
of data



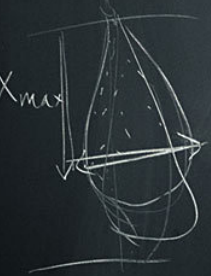
Credit: Double Negative Visual Effects

Credit: Joseph Puhly

Doron Kushnir



$L \nu \Rightarrow \epsilon \frac{2\pi h}{\lambda} - \epsilon$
 A
 P



$10 \mu\text{m}$
 $P_{10 \text{ Hz}}$

$\frac{h}{\lambda} \sim 2\epsilon \epsilon_{1h}$

$3 \Delta N$
 $\frac{\Delta N}{\Delta t}$

Fe
 Py

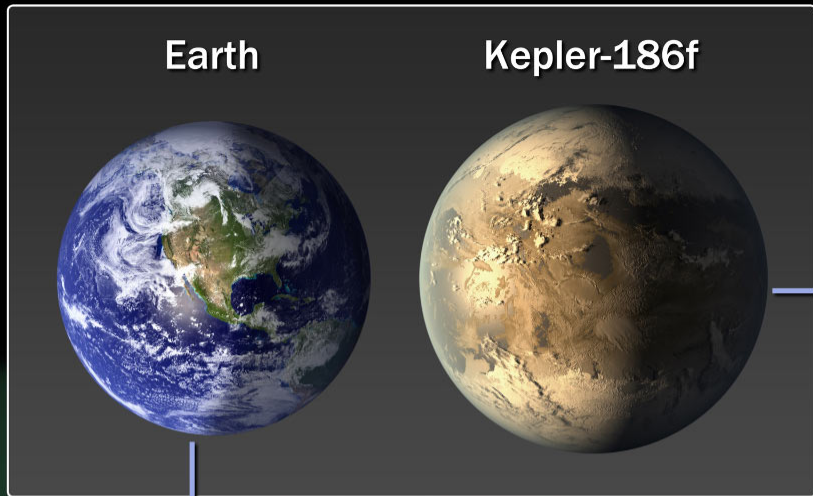




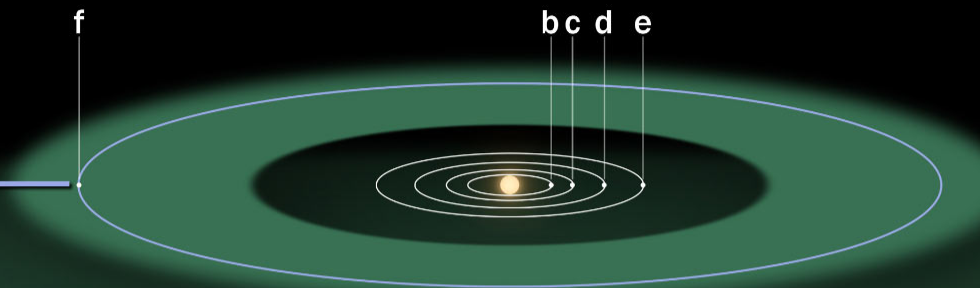
Credit: Double Negative Visual Effects

998

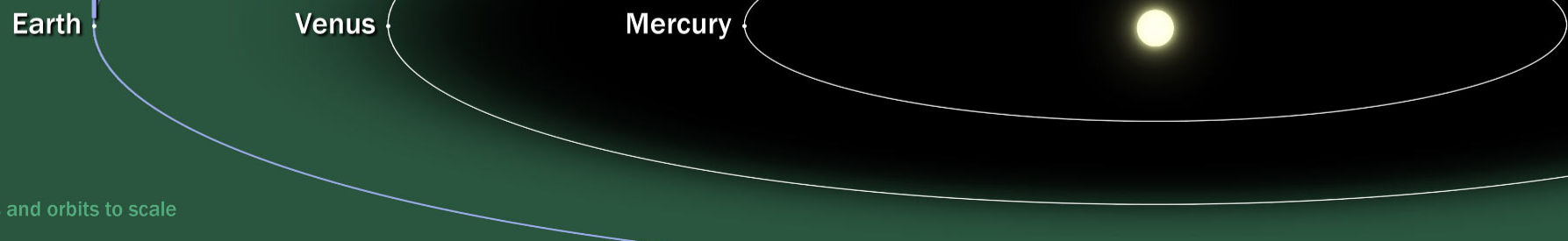
Kepler exoplanets



Kepler-186 System



Solar System



Planets and orbits to scale



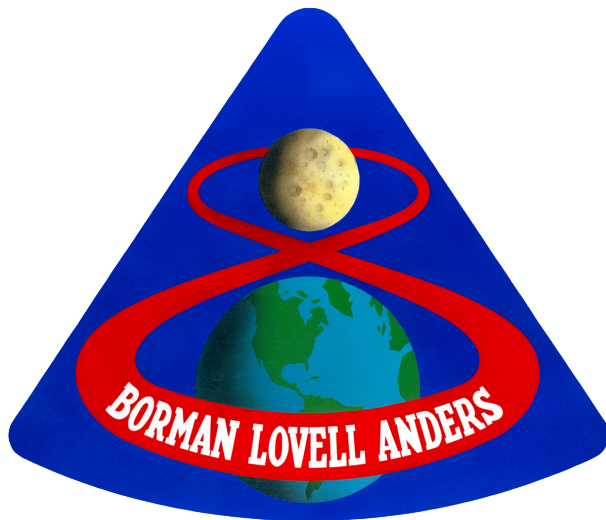
10

lunar orbits

Credit: NASA



James Lovell Jr.,
William Anders
& Frank Borman

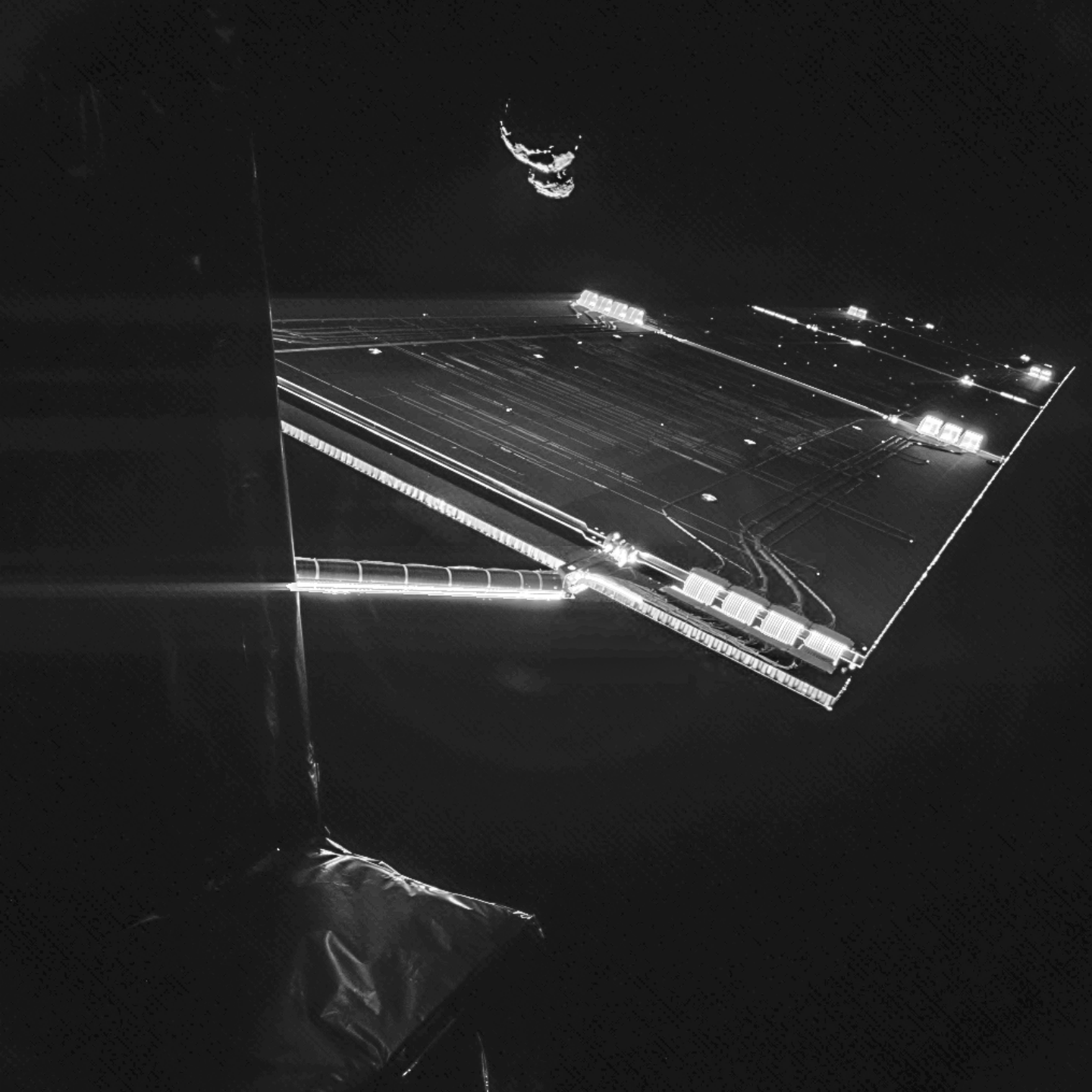


Credit: NASA



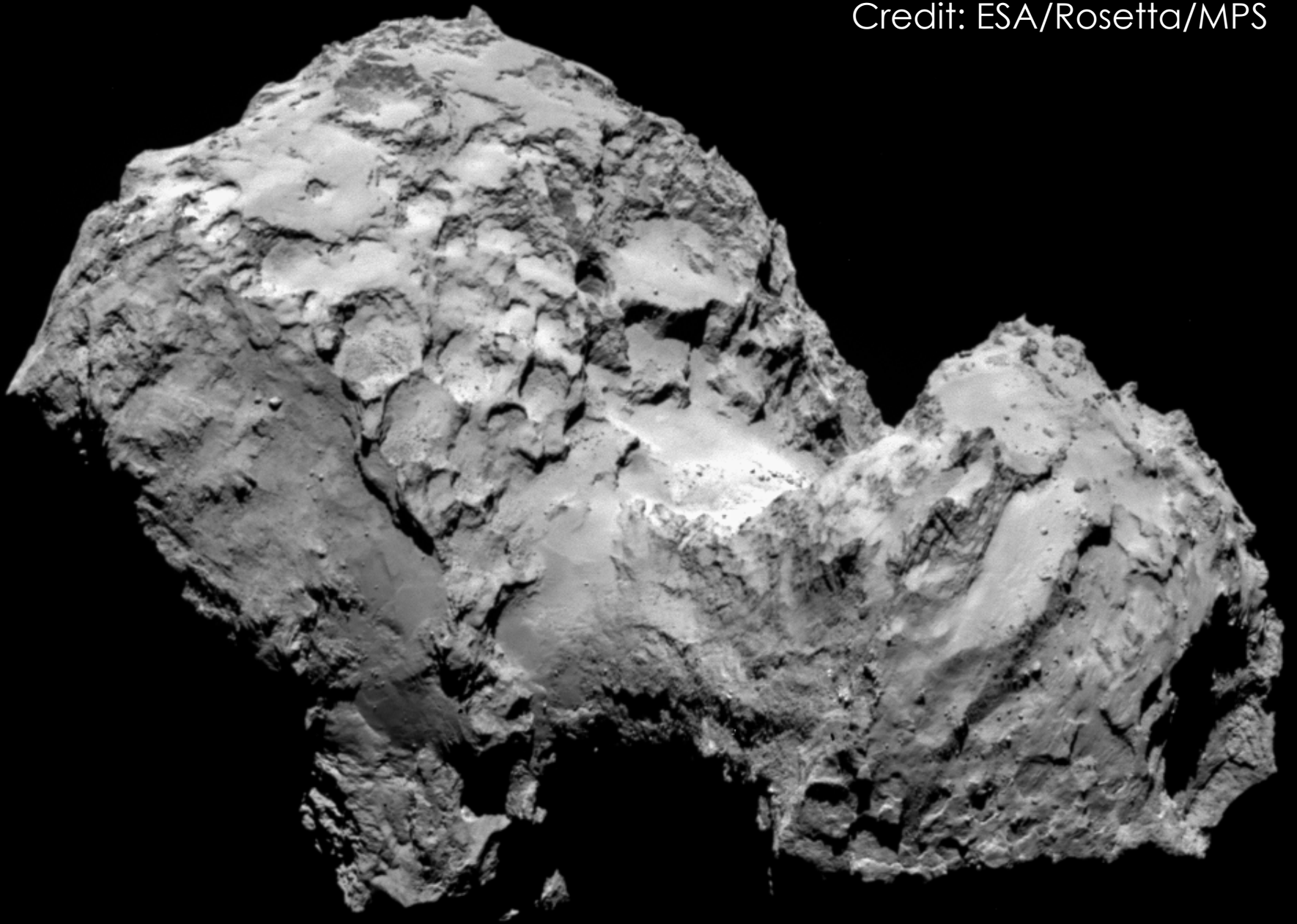
11 (10 3/4)

years for
Rosetta

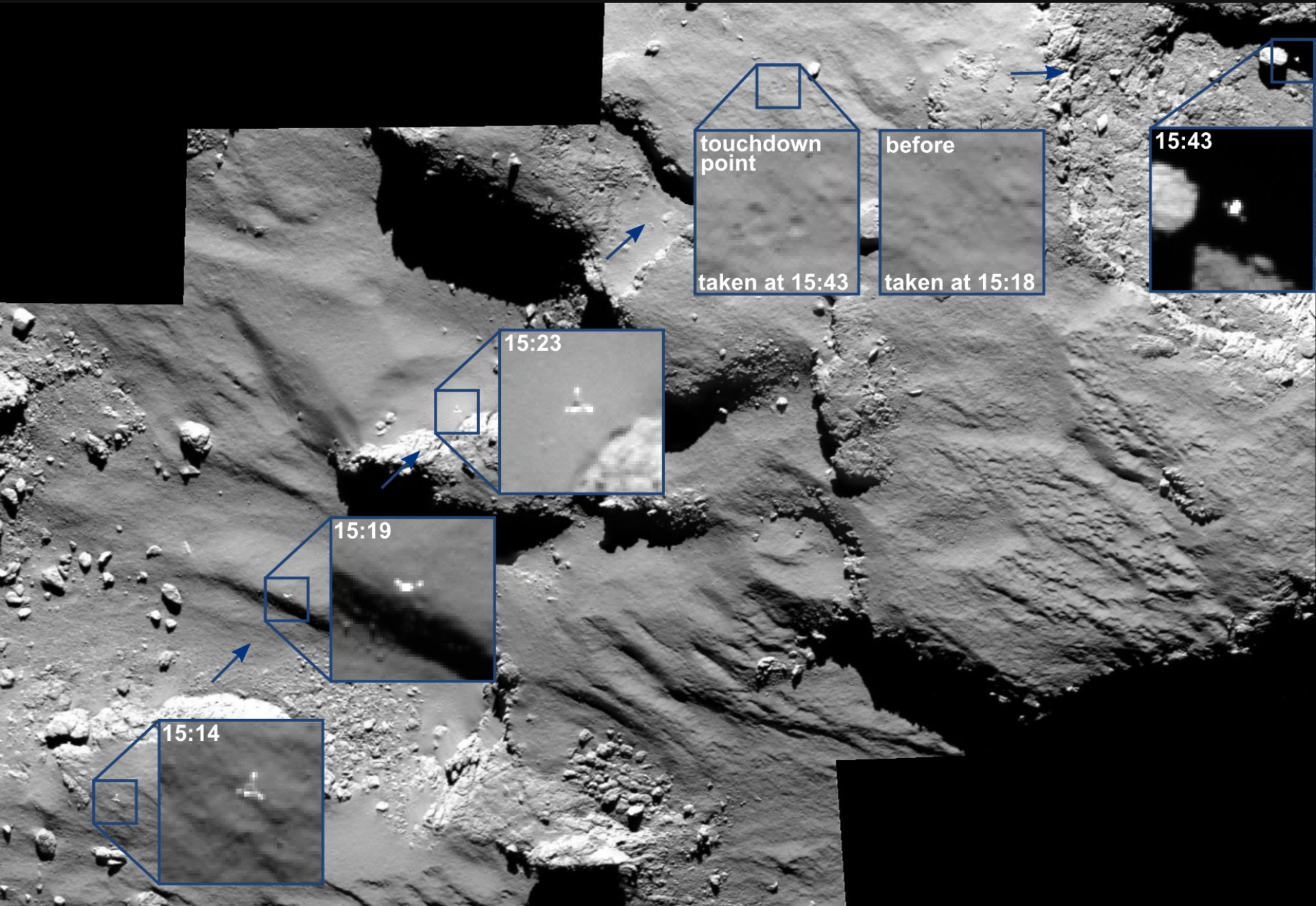


Credit:
ESA/Rosetta/
Philae/CIVA

Credit: ESA/Rosetta/MPS



Credit: ESA/Rosetta/MPS



touchdown point
taken at 15:43

before
taken at 15:18

15:43


15:23

15:19

15:14

Credit: ESA/Rosetta/Philae/CIVA






12 (plus)
galaxies in a
cluster



Credit: NASA/CXC/CfA/STScI/ESO/U.Arizona/M.Markevitch/D.Clowe

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The background of the slide is a repeating, ornate floral pattern in shades of brown and gold. The pattern consists of stylized leaves, scrolls, and floral motifs arranged in a grid-like fashion. In the center of the slide, there is a white rectangular box containing text.

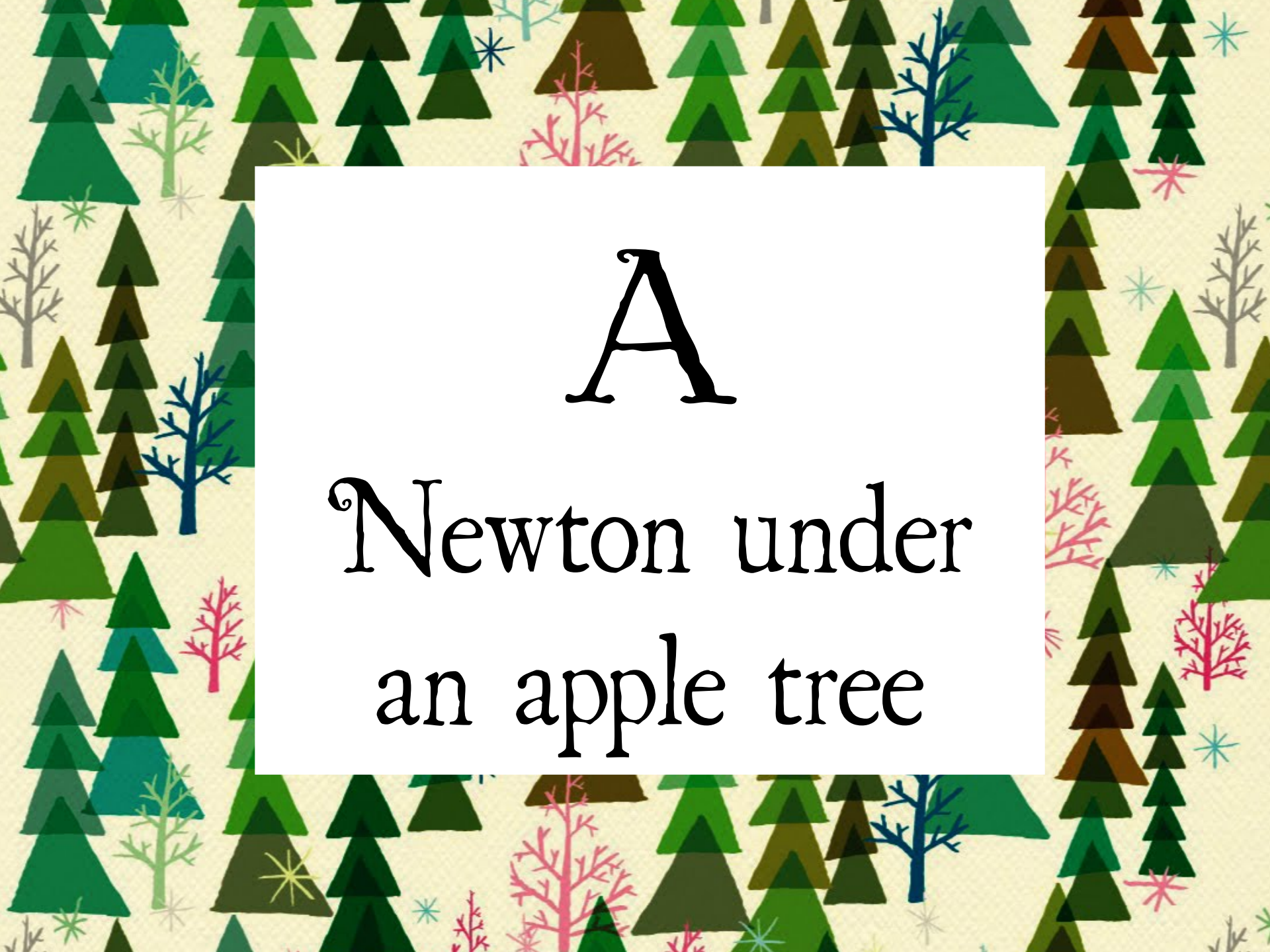
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components of a
cluster



2

clear nights
observing



A
Newton under
an apple tree



Season's Greetings!

