AnimaScience

17 novembre 2023

Picked up for you in the scientific news…

[Dinkinesh asteroid flyby by NASA's Lucy Spacecraft]

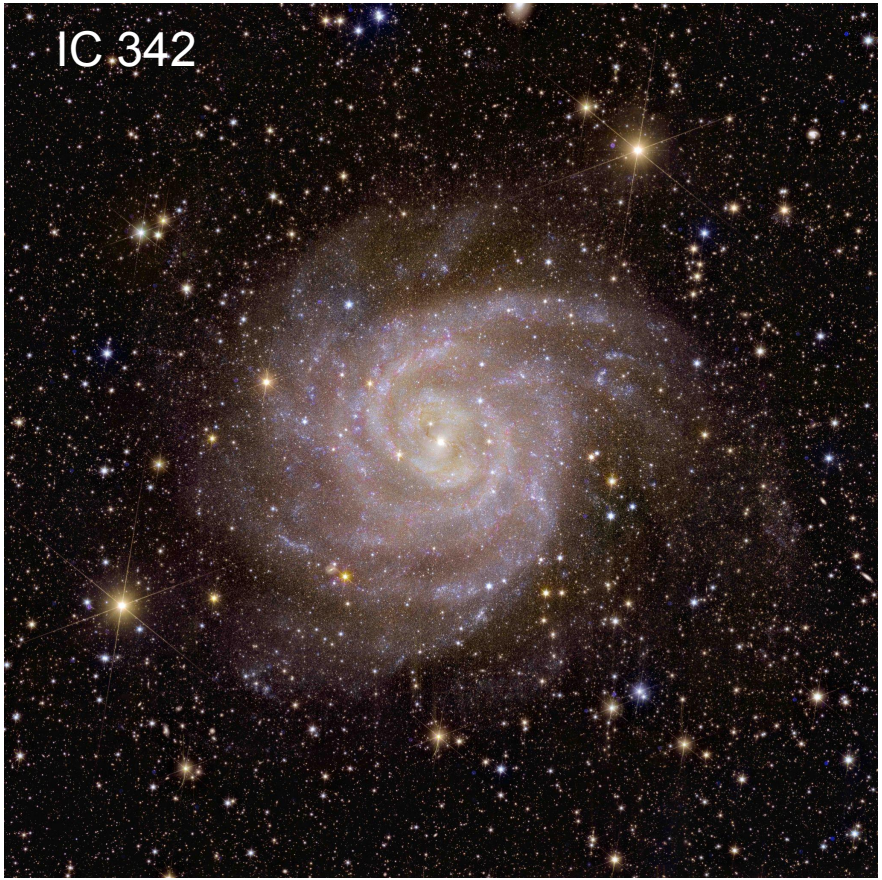
⇒ It's double !

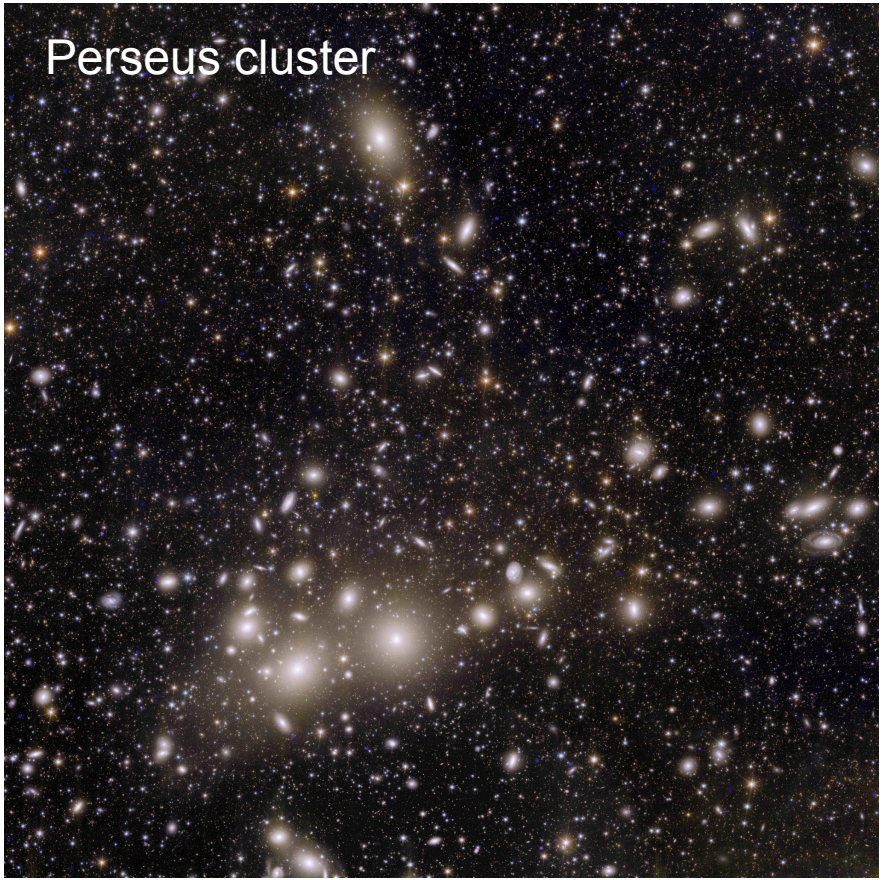
Next flybys:

- Donaldjohanson in 2025
- Jupiter Trojan's in 2027

Surprise !

First images from Euclid - See link



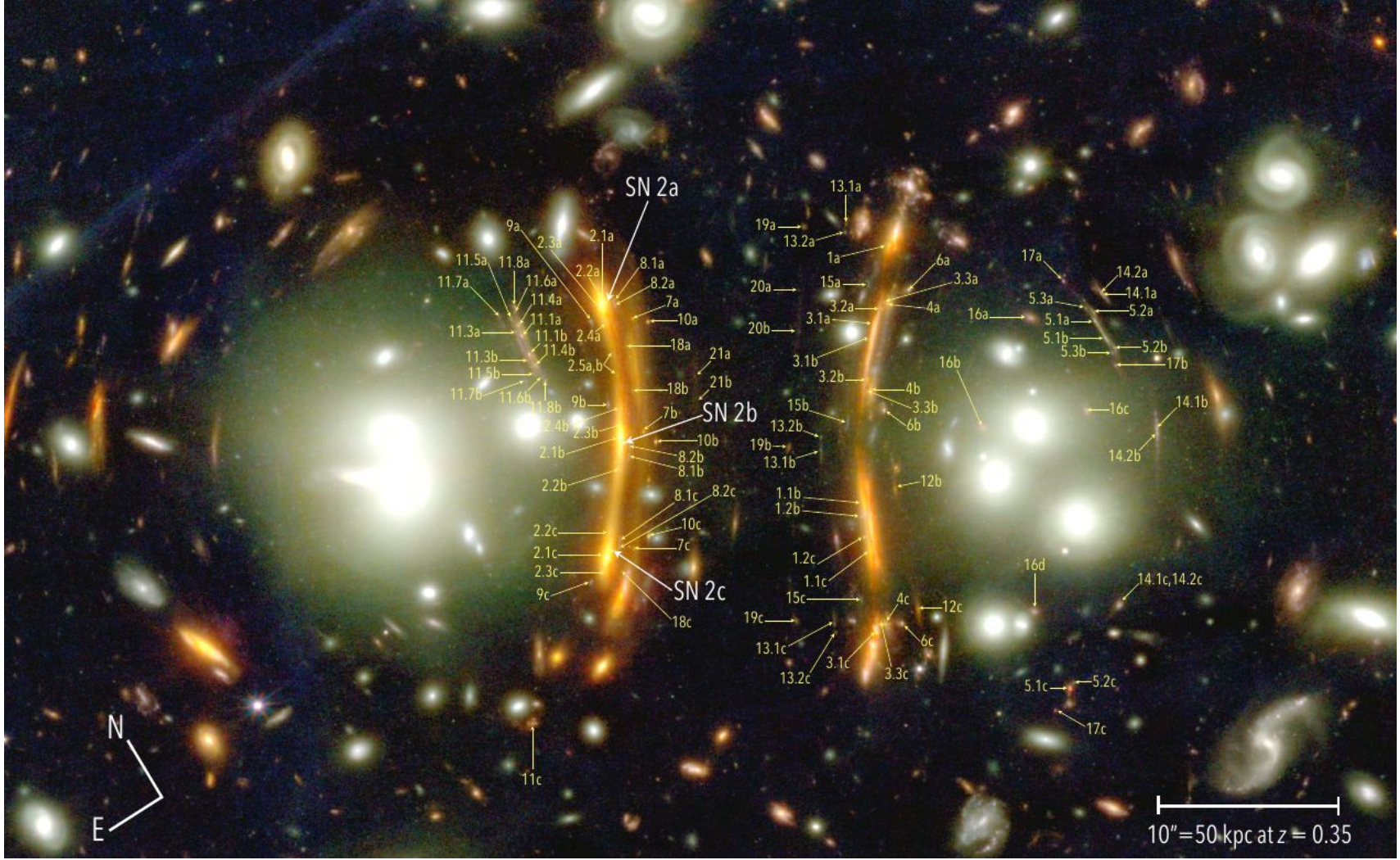


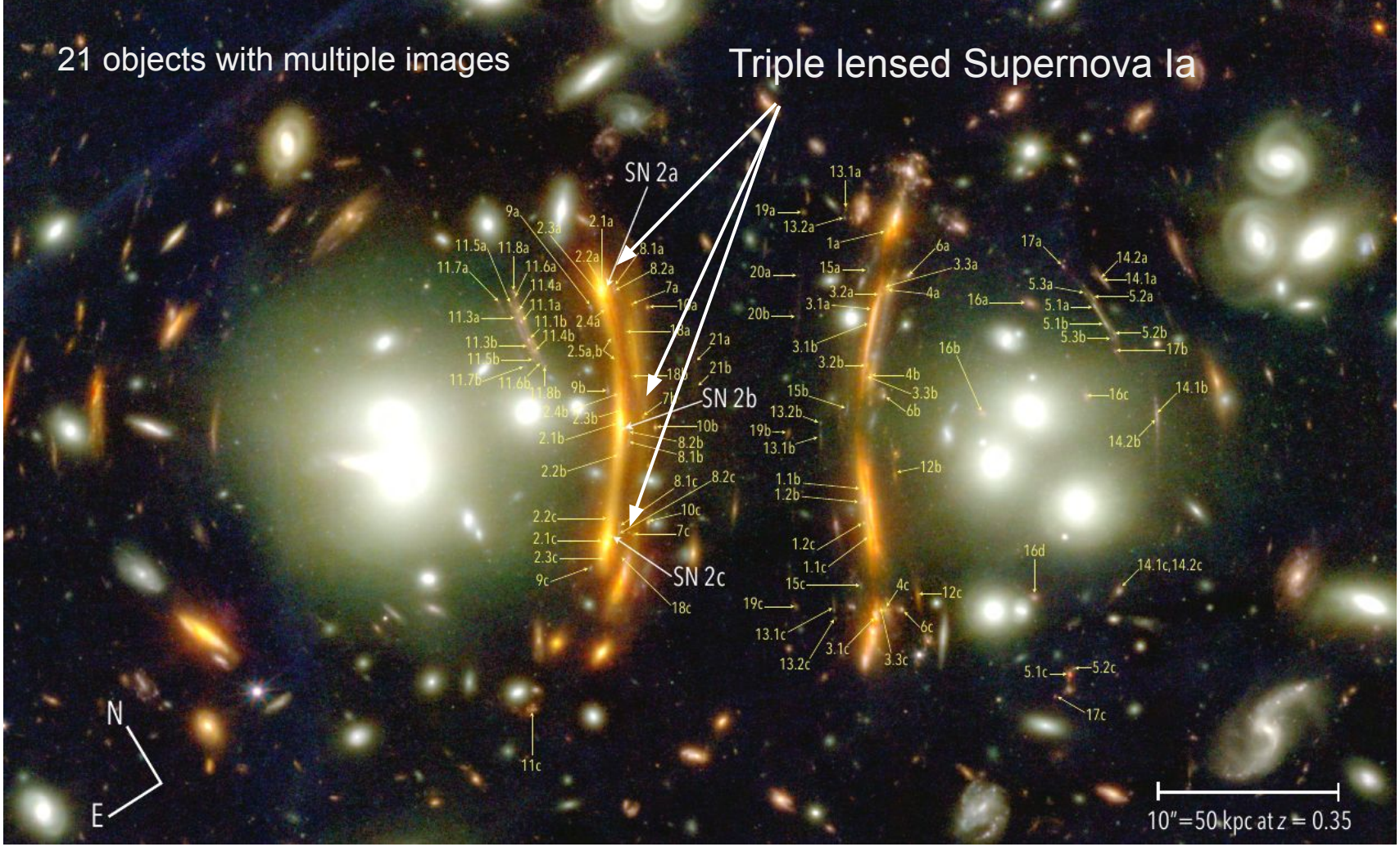
When JWST sees triple… The H0pe Supernova

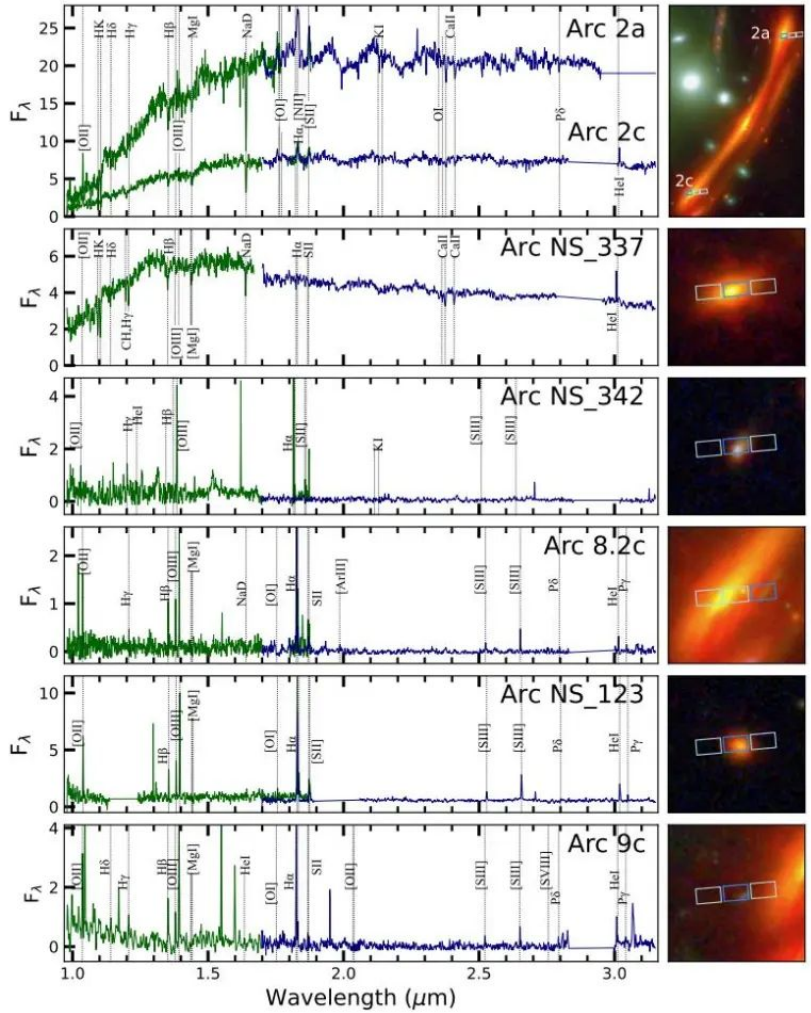
- Discovery
- Spectroscopy
- Starts with a Bang article

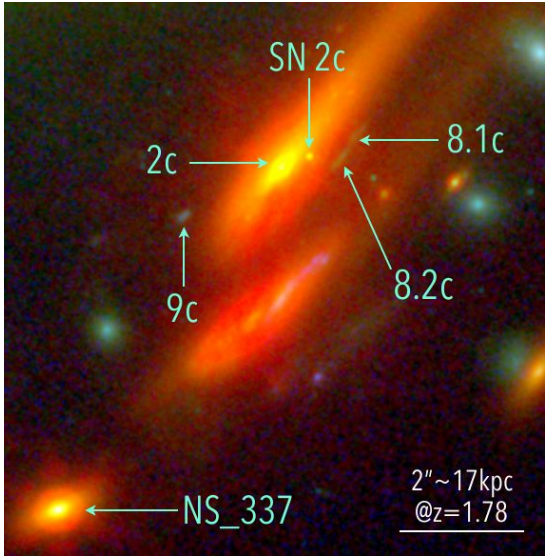
JWST Observation of G165.7+67.0 galaxy double cluster

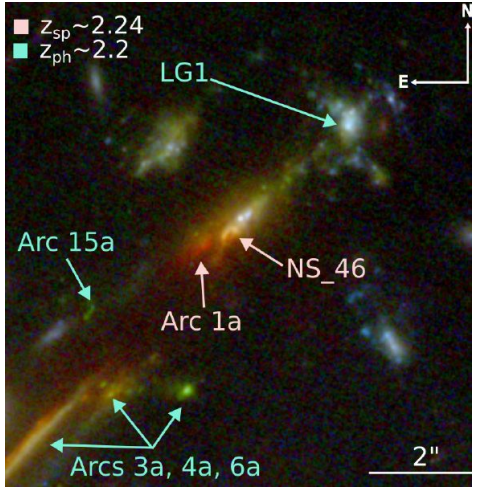
- NIRCam instrument
- Cluster mass: 2.6 10^{14} solar mass
- z = 0.35 - 3.9 Gly (light travel time)


SN 2a
SN 2b
SN 2c
9a
2.3a
2.1a
2.2a
8.1a
8.2a
7a
10a
2.4a
18a
21a
21b
18b
9b
7b
2.3b
10b
8.2b
8.1b
2.1b
2.2b
11.5a
11.8a
11.7a
11.6a
11.4a
11.1a
11.3a
11.1b
11.4b
11.3b
2.5a,b
11.5b
11.7b
11.6b
11.8b
2.4b
8.1c
8.2c
10c
7c
2.2c
2.1c
2.3c
9c
18c
11c
13.1a
19a
13.2a
1a
20a
15a
6a
3.3a
3.2a
4a
3.1a
20b
3.1b
3.2b
4b
3.3b
6b
15b
13.2b
19b
13.1b
12b
1.1b
1.2b
1.2c
1.1c
15c
4c
12c
19c
6c
13.1c
3.1c
3.3c
13.2c
17a
14.2a
14.1a
5.3a
5.2a
16a
5.1a
5.1b
5.2b
5.3b
17b
16b
16c
14.1b
14.2b
16d
14.1c,14.2c
5.1c
5.2c
17c
N
E
10″=50 kpc at z = 0.35


21 objects with multiple images
Triple lensed Supernova Ia
SN 2a
SN 2b
SN 2c
N
E
10″=50 kpc at z = 0.35





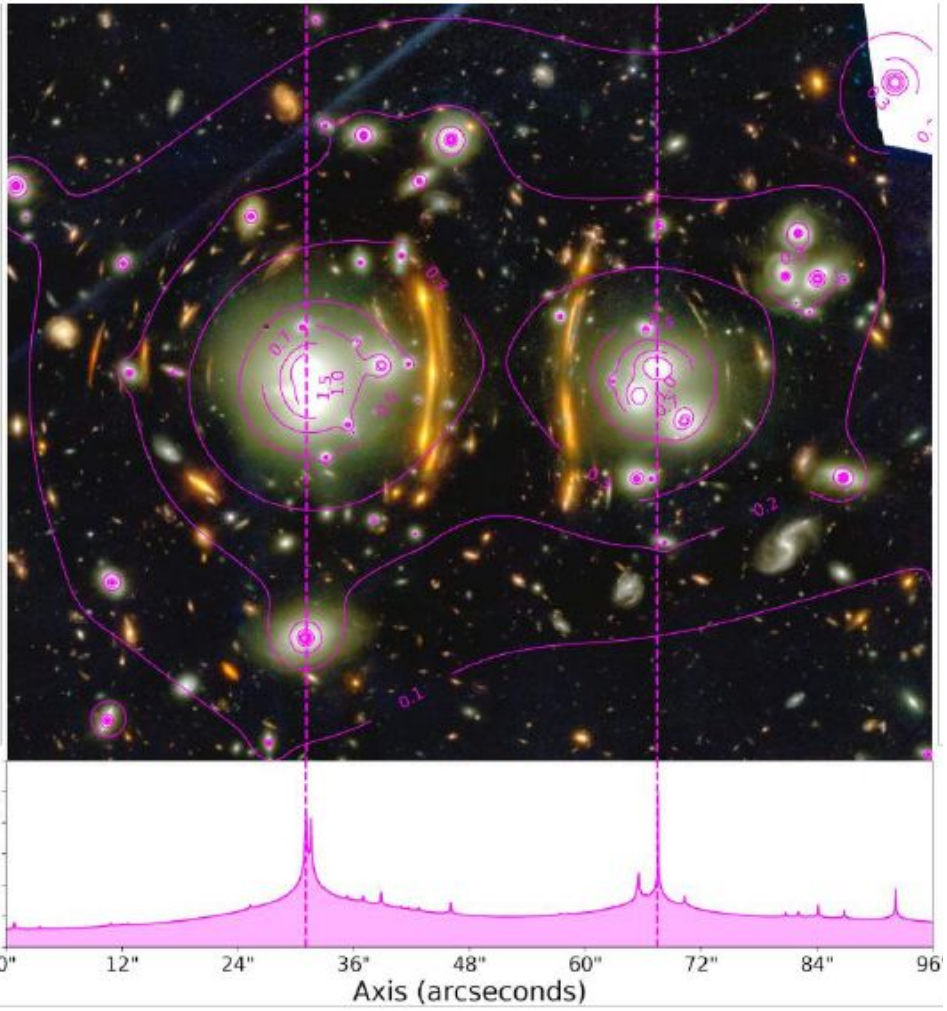


Several background galaxies are located at the ~same redshift as the SN Ia

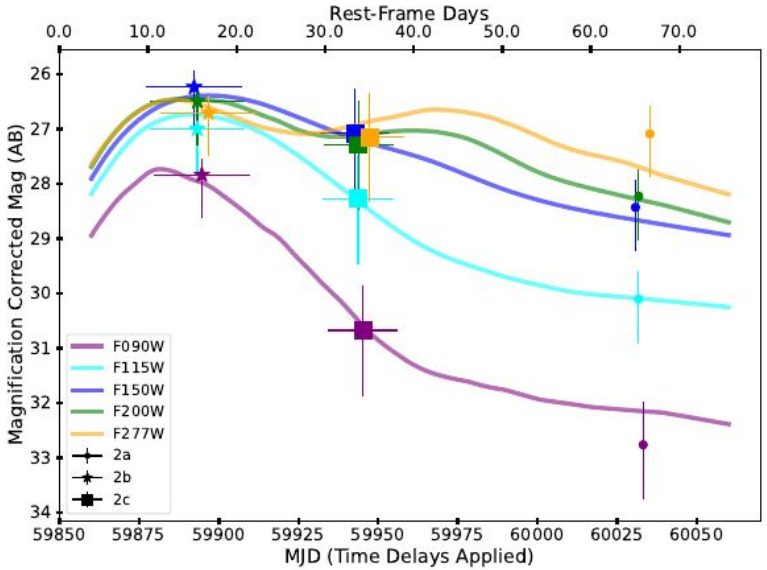
- z = 1.783 ± 0.002

2 other regions with galaxy overdensities

- z = 1.65 (Arc 2)
- z = 2.24 (Arc 1)



G165 mass distribution reconstructed from the multiple lenses



Given the mass model it is possible to adjust a SN Ia light curve that coincide with the 3 images and extract a time delay

More observations have been done to refine the model

⇒ **will lead to H_0 determination**

Time delay:

$$t = \frac{1}{c} D_{\Delta t}\, \phi_{\text{lens}}$$

Time-delay distance: $D_{\Delta t} \propto \frac{1}{H_0}$

Obtain from lens mass model

Galaxy over-densities are identified as star forming region

- $\gtrsim$ 400 Solar masses / year

One can expect the discovery of new Supernovae while monitoring this cluster

- ~1 SN / year in Arc 1 region

From : **S. Suyu** : https://irfu.cea.fr/dap/Phocea/file.php?file=Seminaires/4347/Suyu_SaclayCEA_seminar_11July2019.pdf