

Discovery of the Progenitor of the Type Ia Supernova 2007on

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SN 2007on

- R.A. : 03 h 38 m 50.9 s
- Dec. : $-35^{\circ} 34' 30''$
- Distance: 20 Mpc
- Location: NGC 1404 (elliptical galaxy)



Hubble
Optical Image
of NGC 1404



Chandra X-ray
Image of the
Fornax Cluster

News

- Near the position of detected supernova Type Ia 2007on, there is a discovered object in Chandra images taken more than four years before the explosion



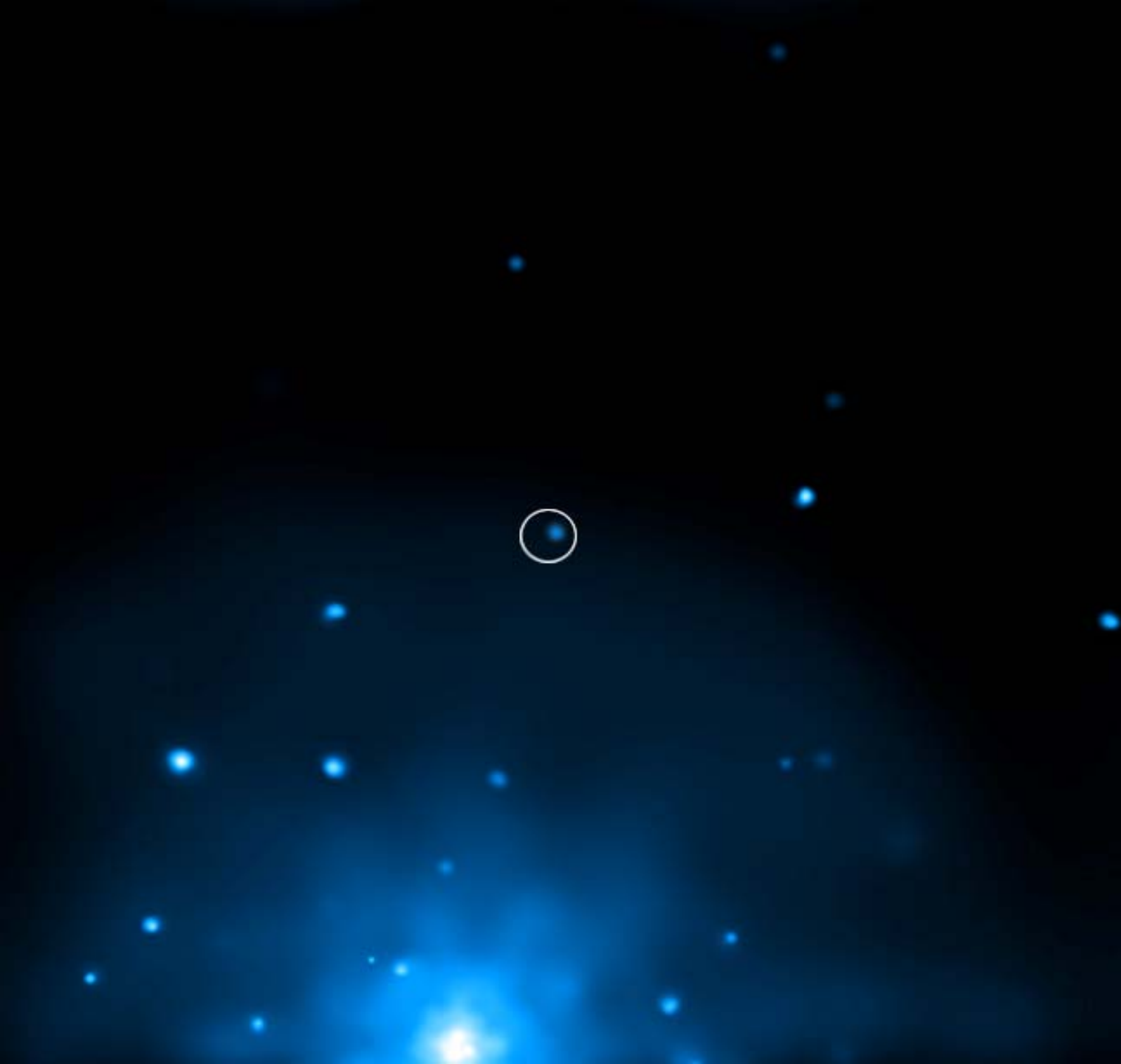
SWIFT Optical
Image of
SN2007on in
NGC 1404

News

- Type Ia supernovas are produced by the explosion of a white dwarf star in a binary system
- The exact configuration and trigger of the explosion is unclear

News

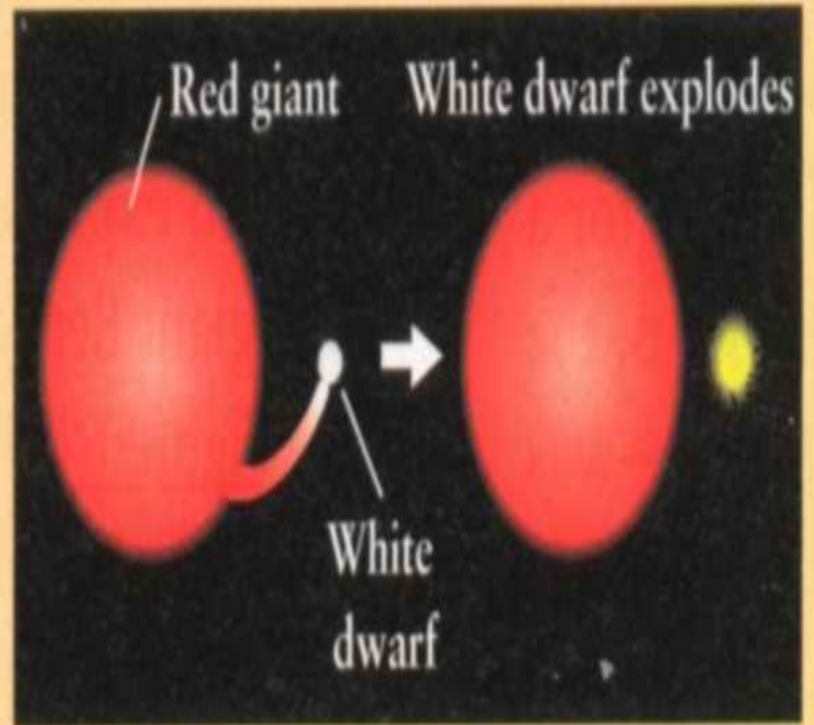
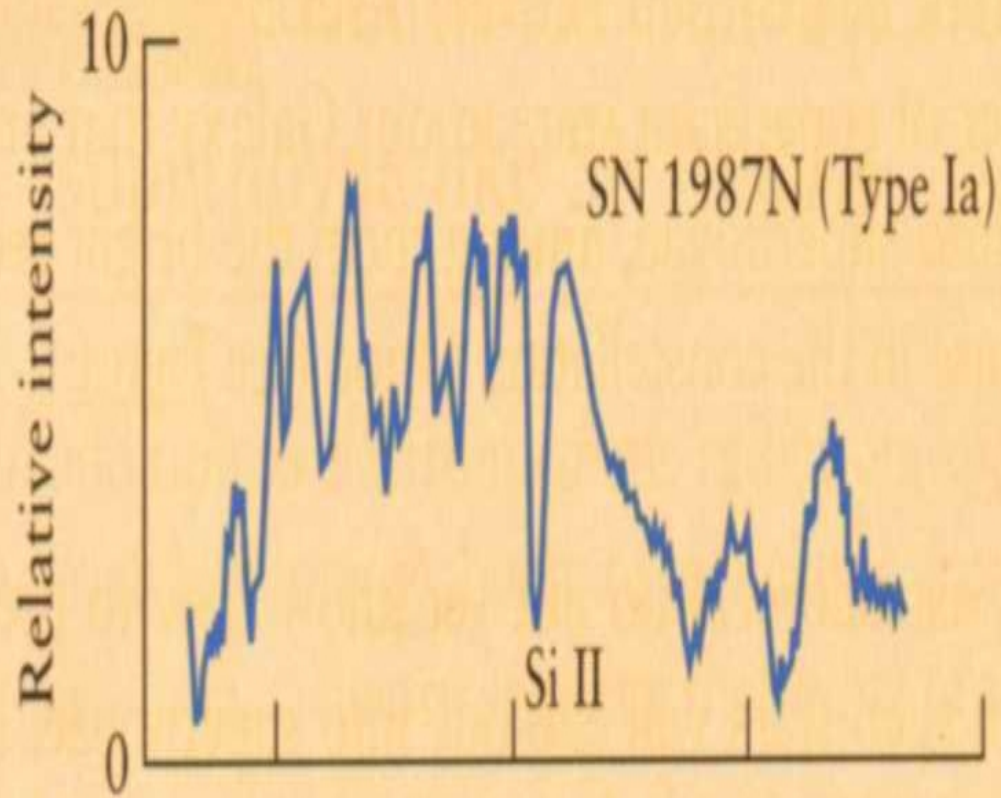
- Two configurations for the progenitor models are proposed:
 - (1) A white dwarf accretes material from a companion star until it exceeds the Chandrasekhar mass
 - (2) The explosion is caused by a collision between two white dwarfs



Chandra X-
ray Image of
SN2007on in
NGC 1404

News

- If in merger model the explosion immediately follows the merger, the progenitor is not expected to emit X-rays before the supernova explosion
- From the Chandra data, the authors conclude the X-rays source is the progenitor of the supernova 2007on
- They favor the accreting model



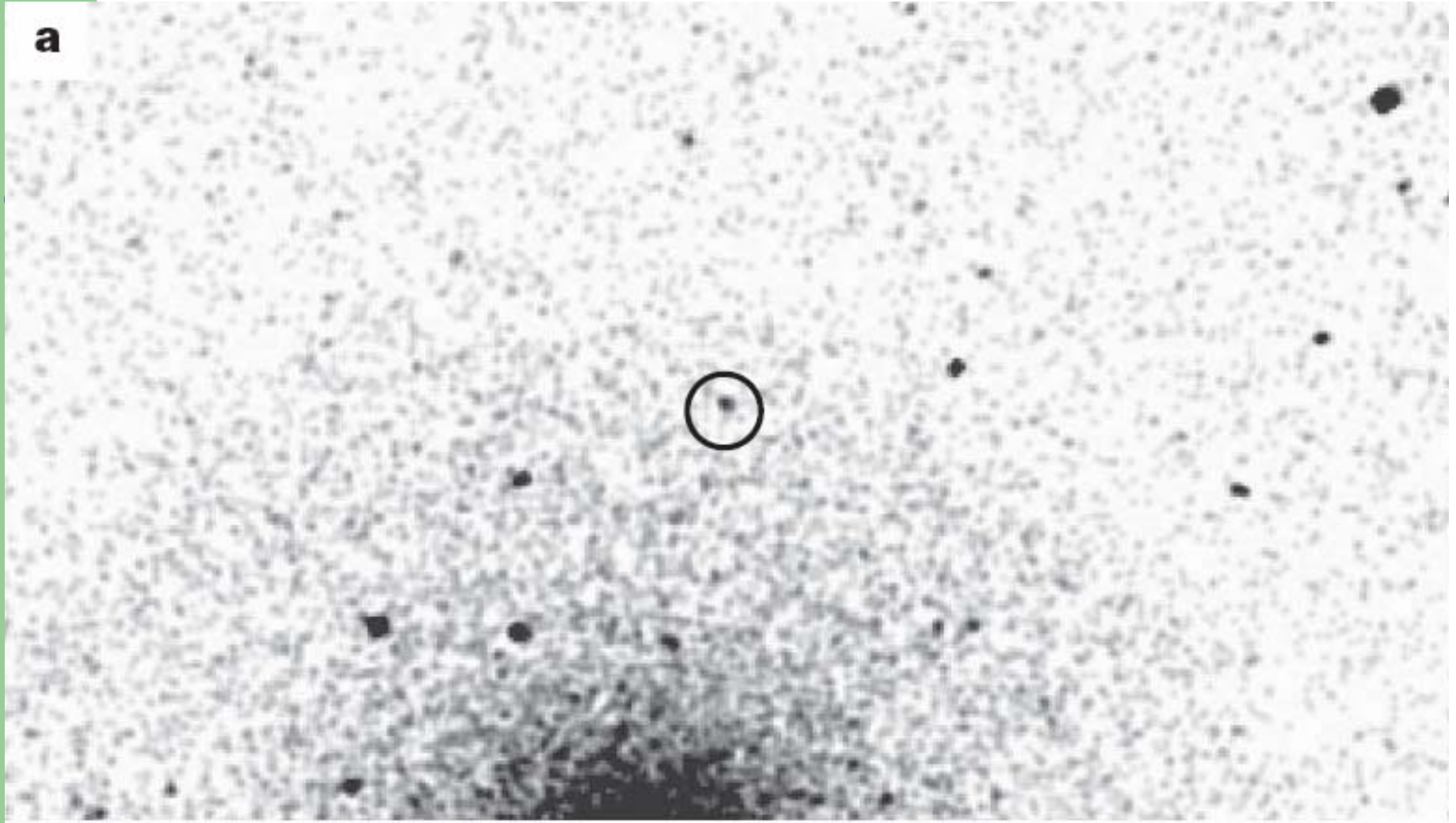
References

- http://chandra.harvard.edu/press/08_release_s/press_021308.html
- <http://www.universetoday.com/2008/02/14/researchers-find-a-supernova-before-it-exploded/>
- **Nature** 451, 802 - 804 (14 Feb. 2008)



>>Thank you<<

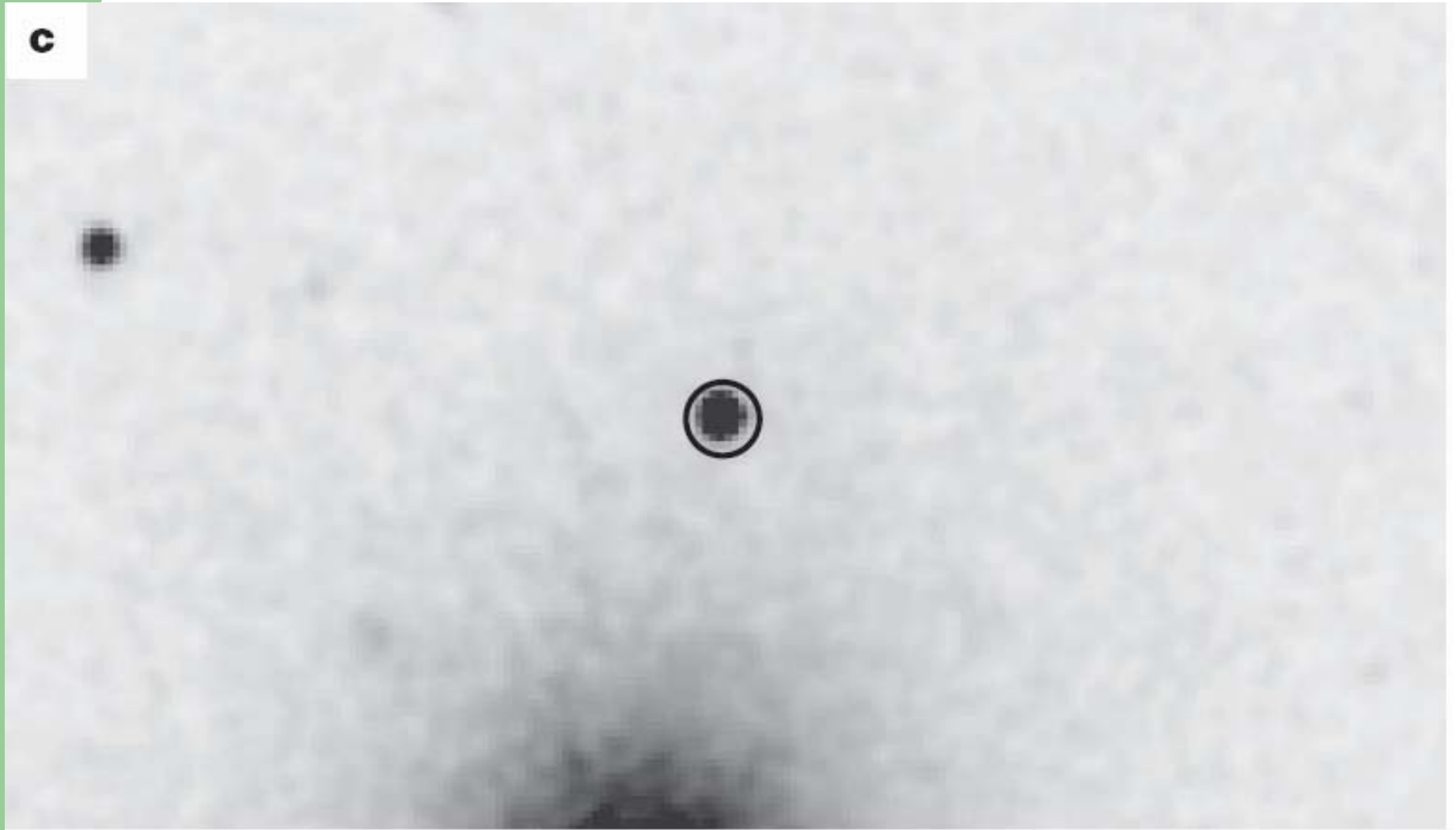
a



b



c



Supernova

2007on

Galaxy

NGC 1404

Galaxy type

Elliptical

Distance (Mpc)

20

Observation ID

2942 and 4174

Time before supernova

~4 yr

Count rate (s^{-1})

$(1.9 \pm 0.6) \times 10^{-4}$

Luminosity (erg s^{-1})

$(3.3 \pm 1.5) \times 10^{37}$
