JWST Discovery of a Distant Supernova in the Early Universe

STScI | TSOT JADES JWST ADVANCED DEEP EXTRAGALACTIC SURVEY NASA

dcoulter@stsci.edu

Credit: ESO/L. Calçada

Nuclear Physics

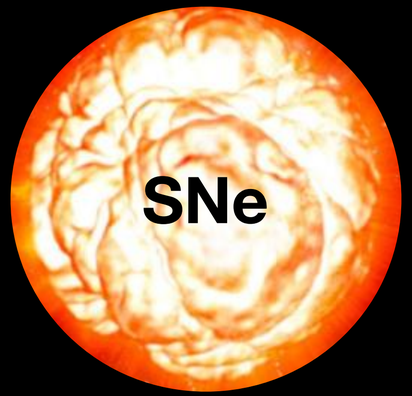
Compact Objects

Cosmic Ray Acceleration

Backlight ISM/IGM

Metal Enrichment

Gravitational Waves



High Energy Phenomemna

Galaxy Feedback/ Evolution

ISM Shape

Cosmology

Stellar Evolution

Star Formation/ First Stars

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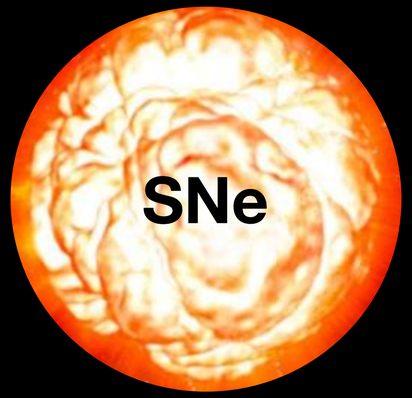

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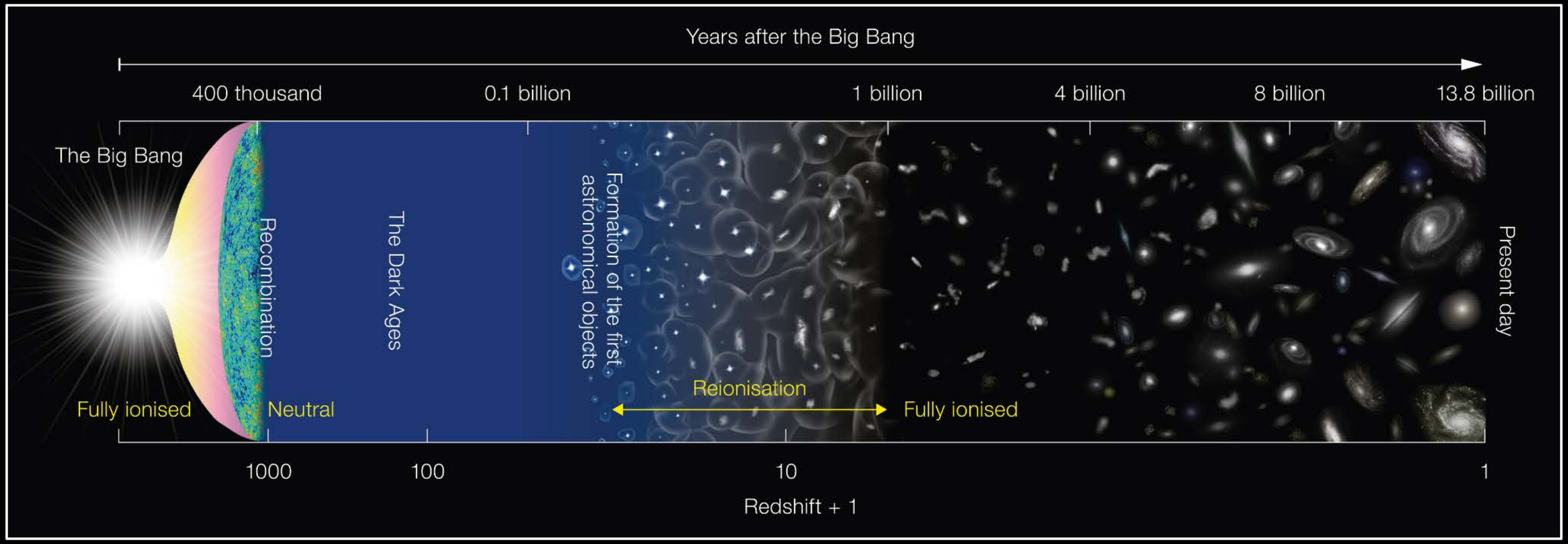
In the Beginning… There Was Hydrogen



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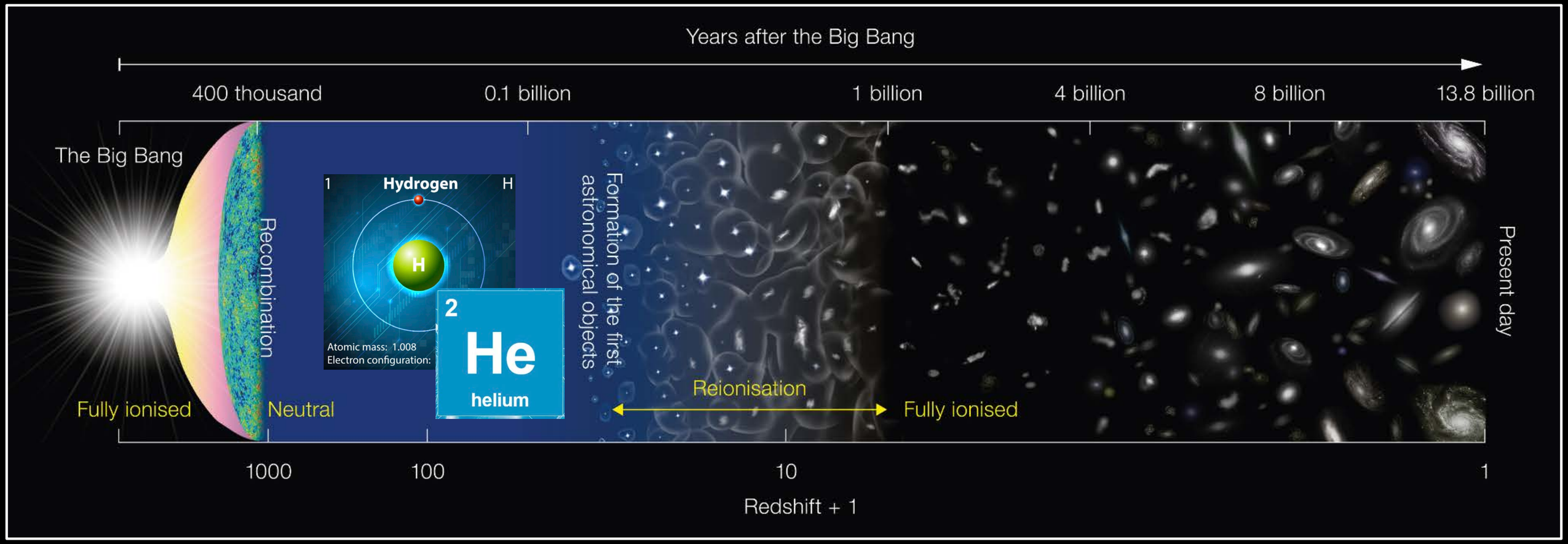

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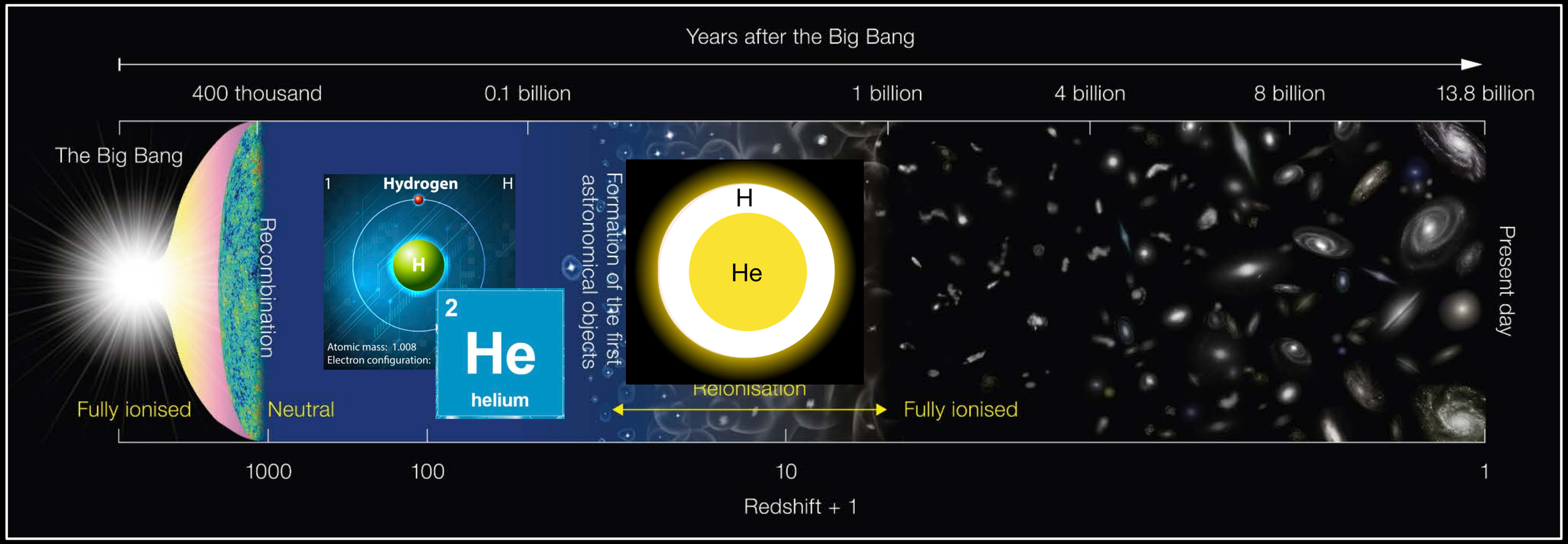

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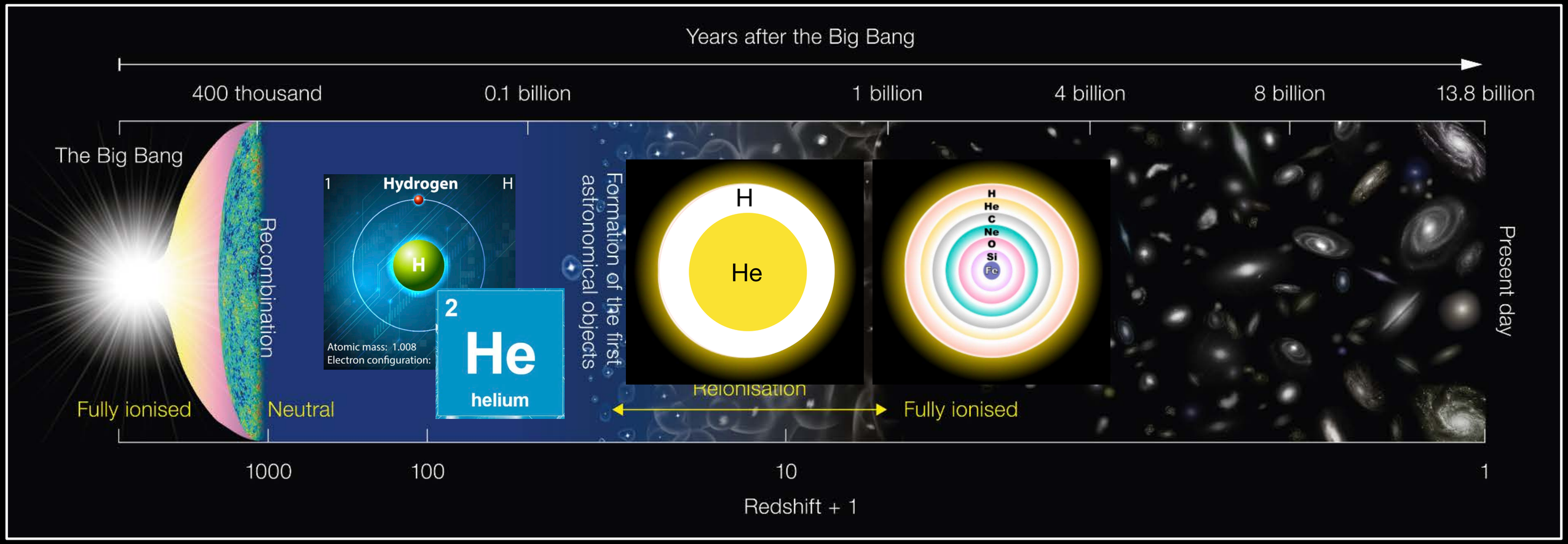

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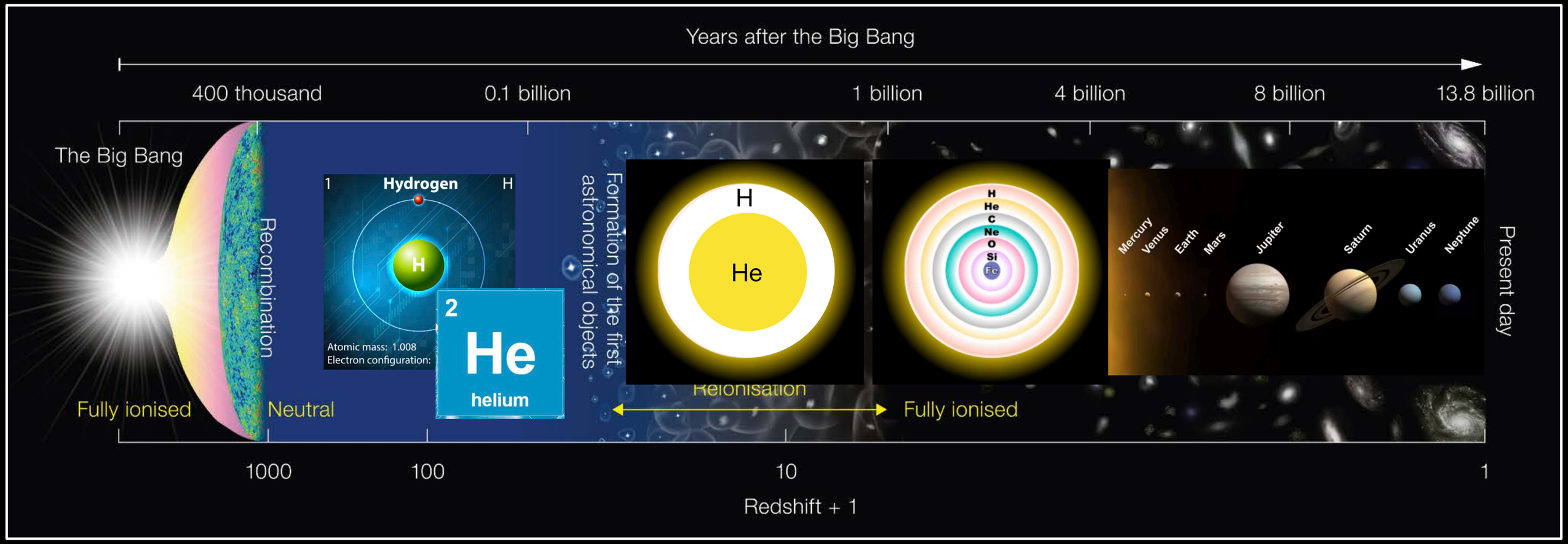

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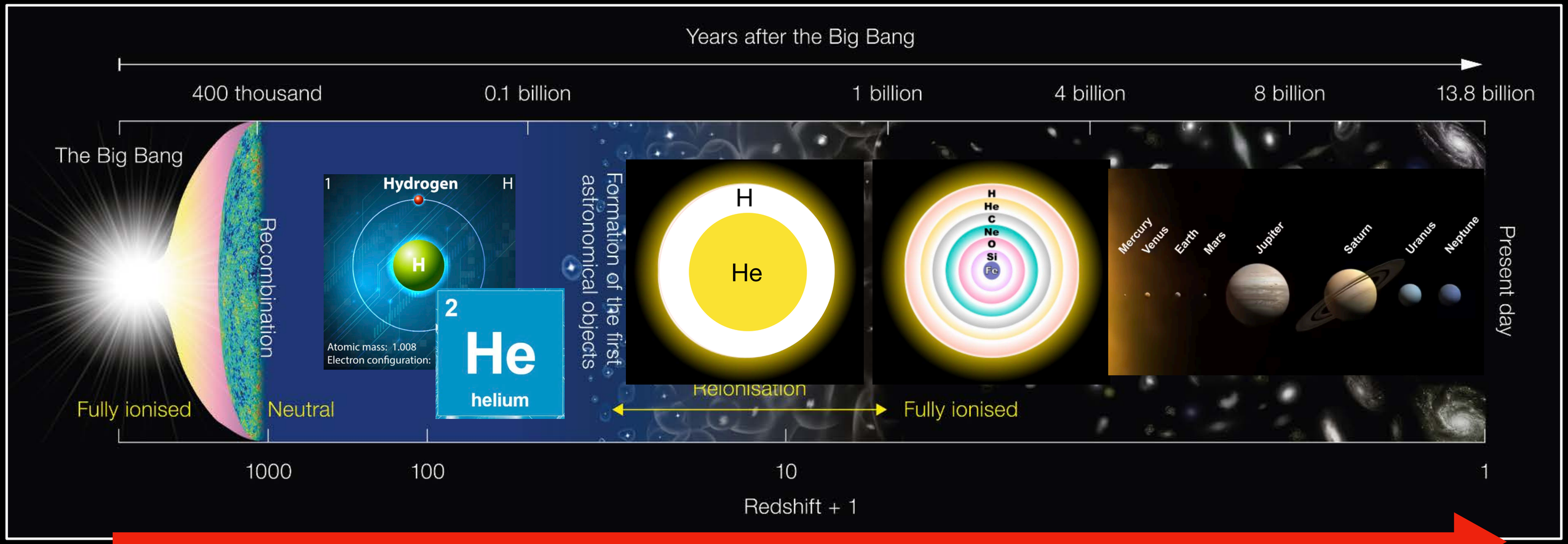

No Heavy Elements

Heavy Elements

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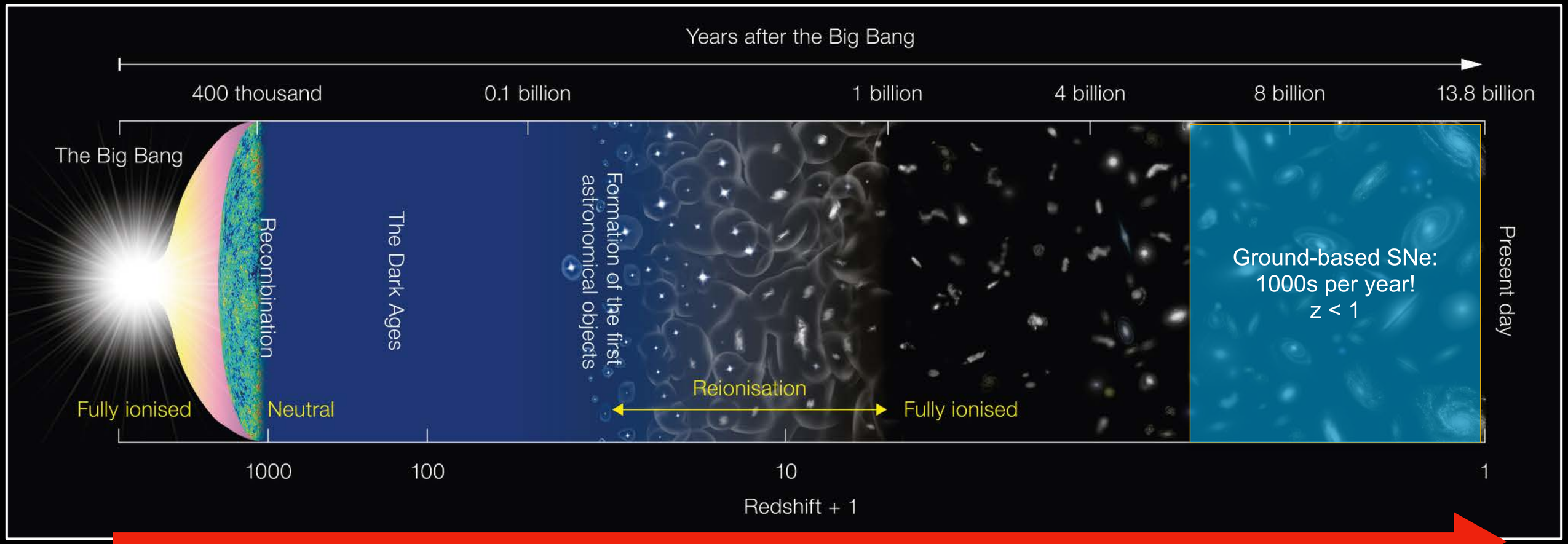
Distant Discoveries Can Reveal How the Universe Evolved



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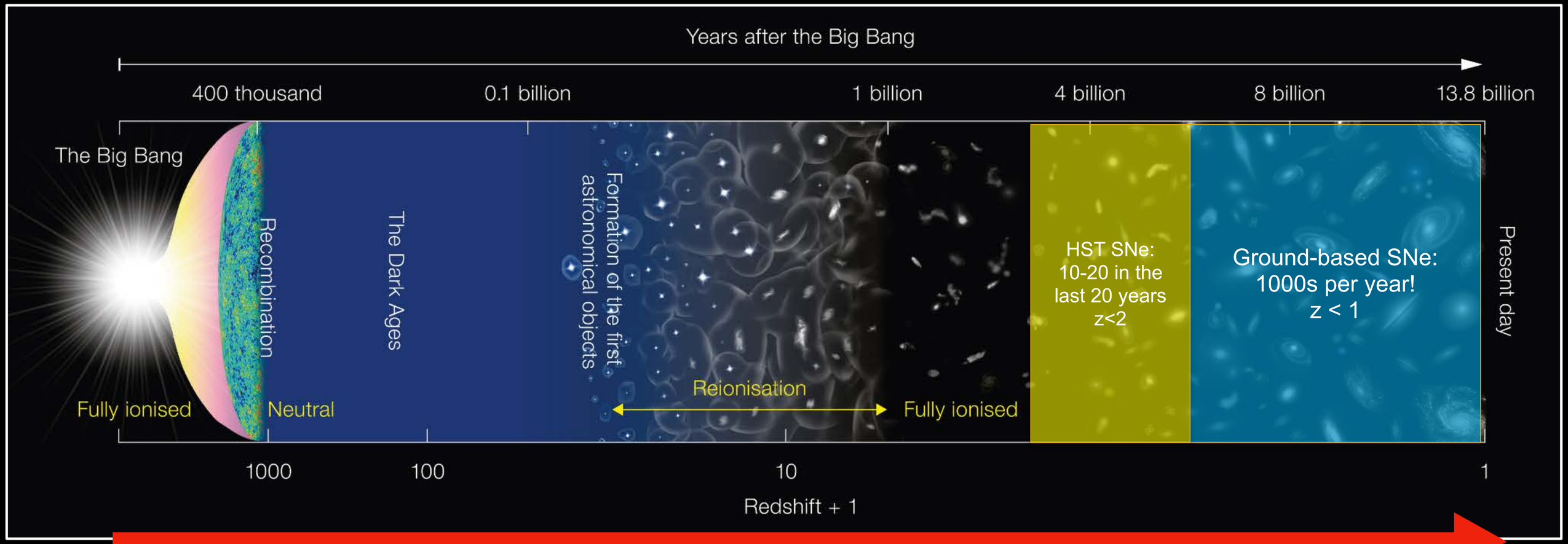

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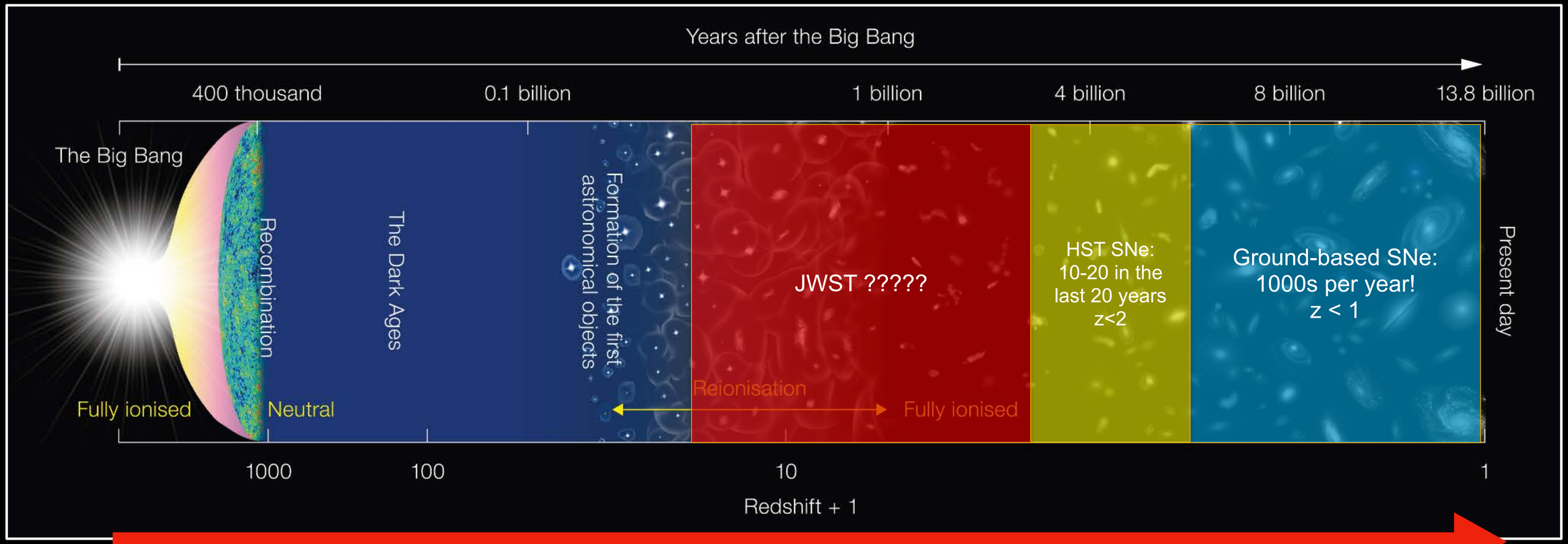

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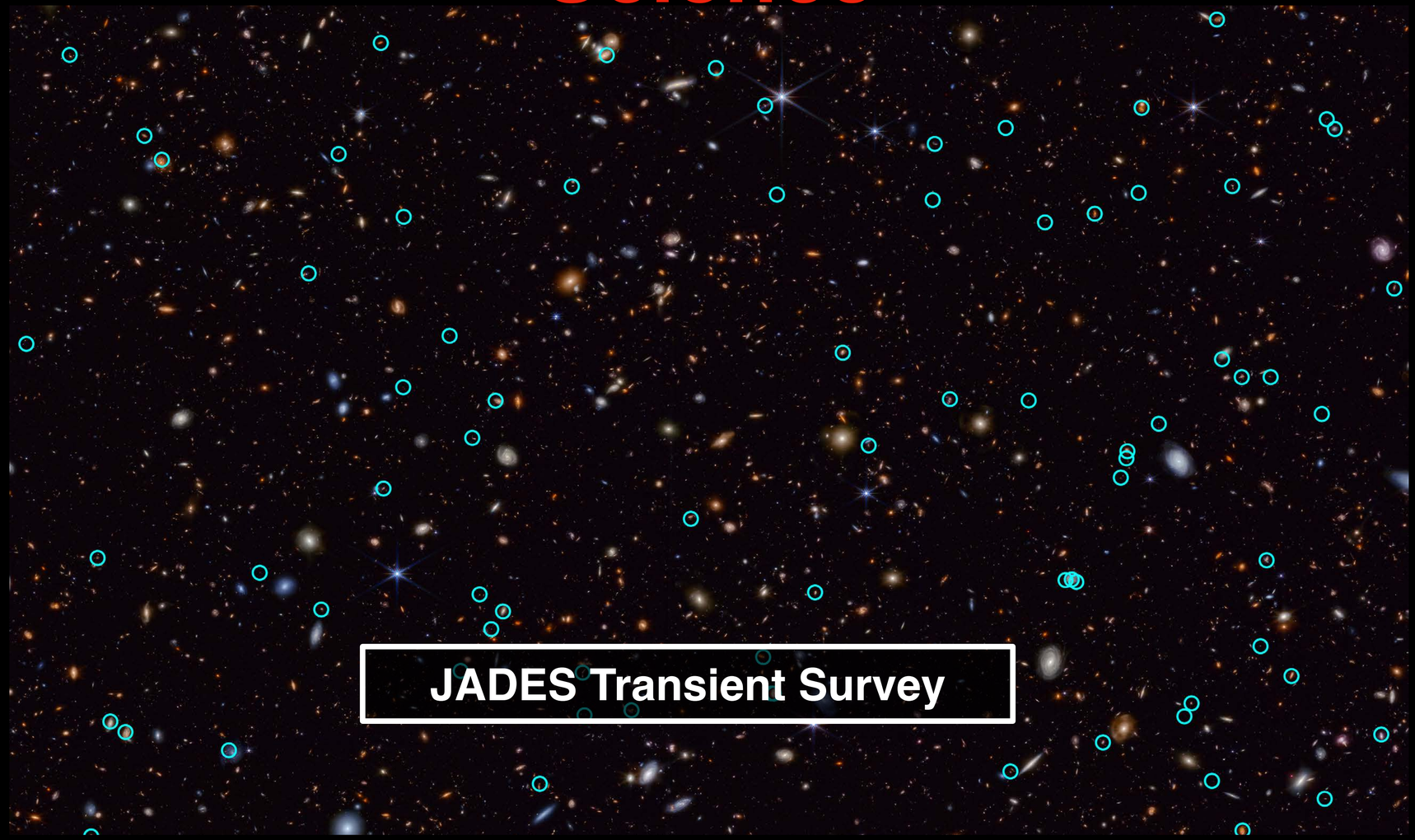
JWST Opens a New Window on Supernova Science

- Area of 25’^{2}
- Depth of m_{ab} ~ 30 mag
- 9 filters
- >80 transients discovered!



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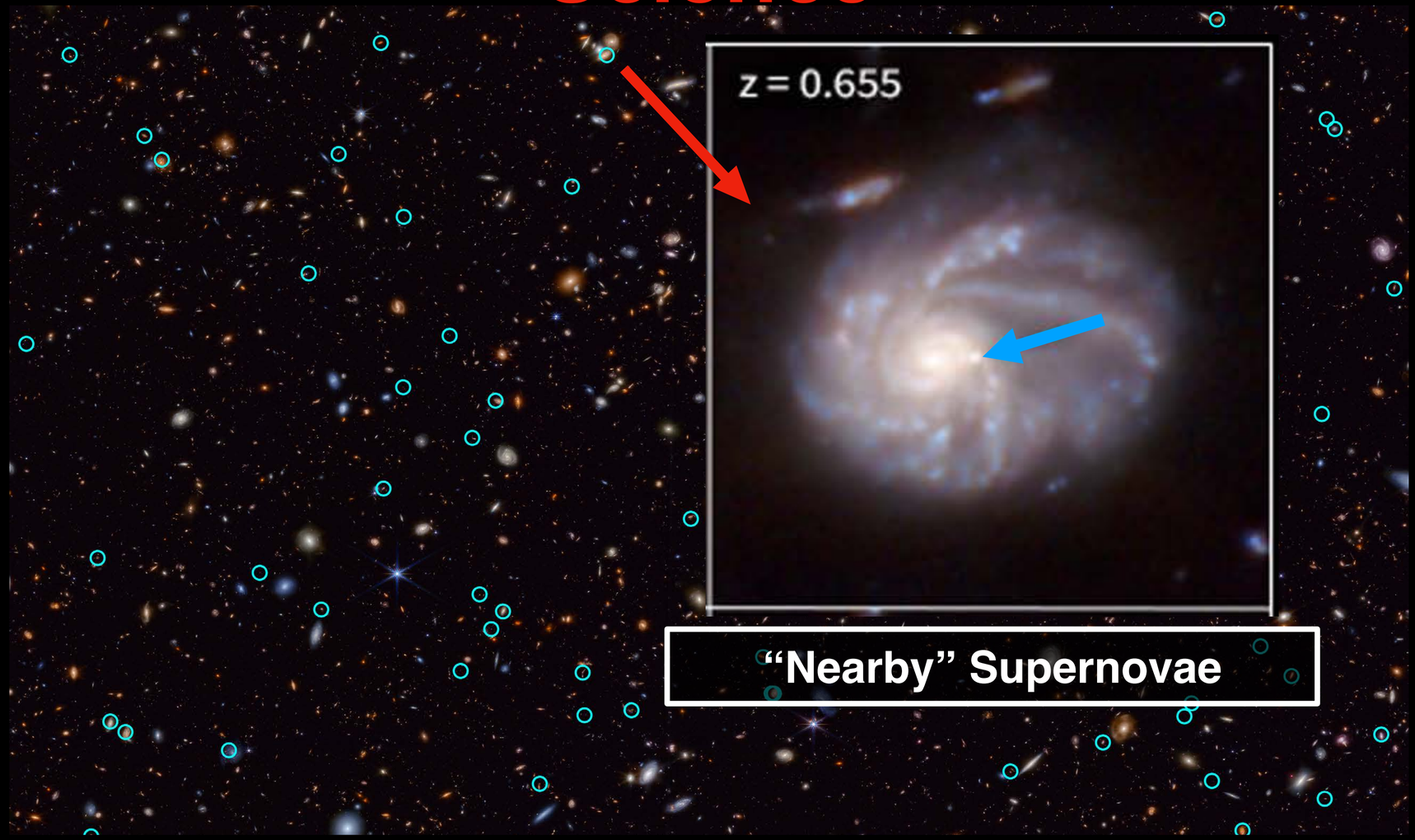

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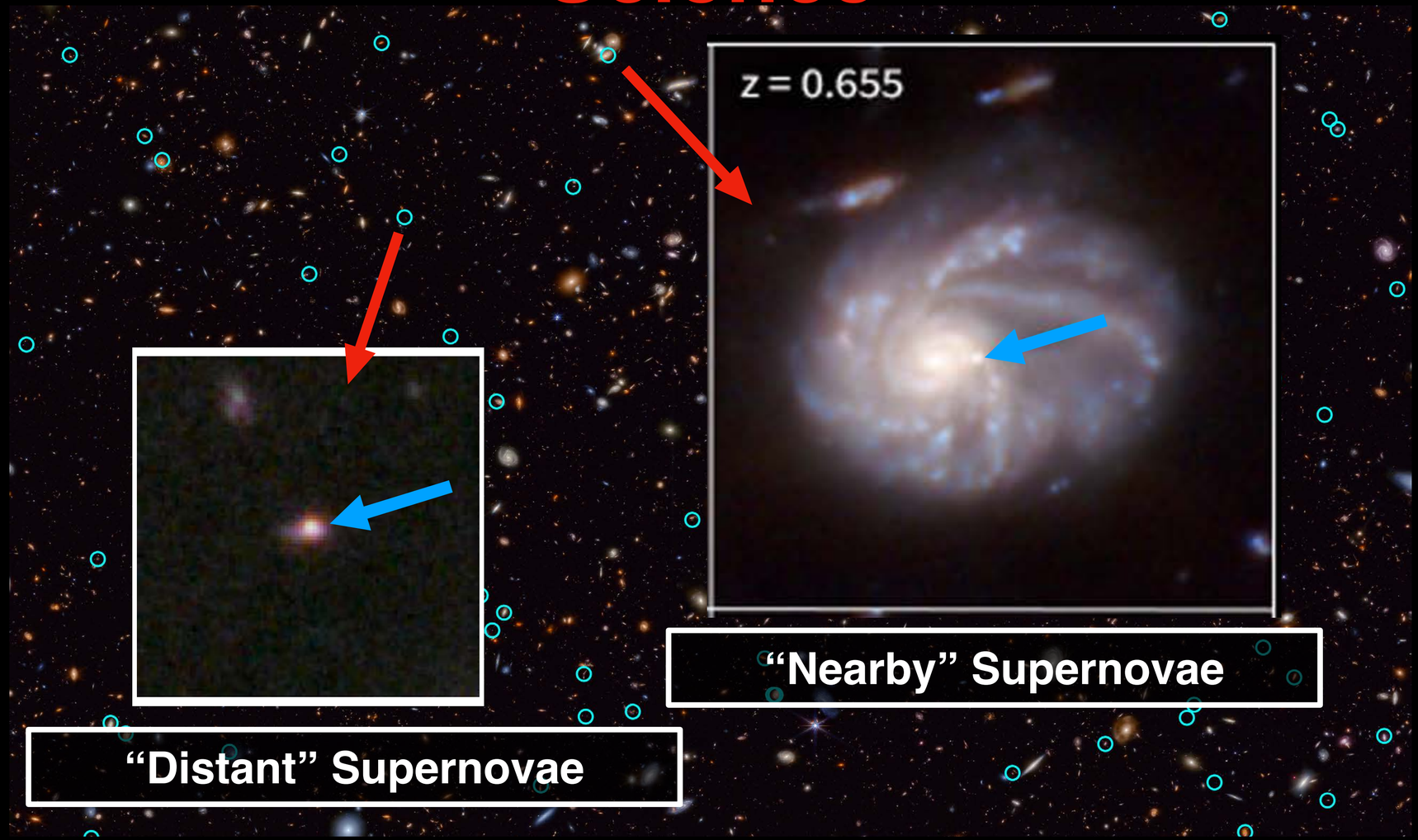

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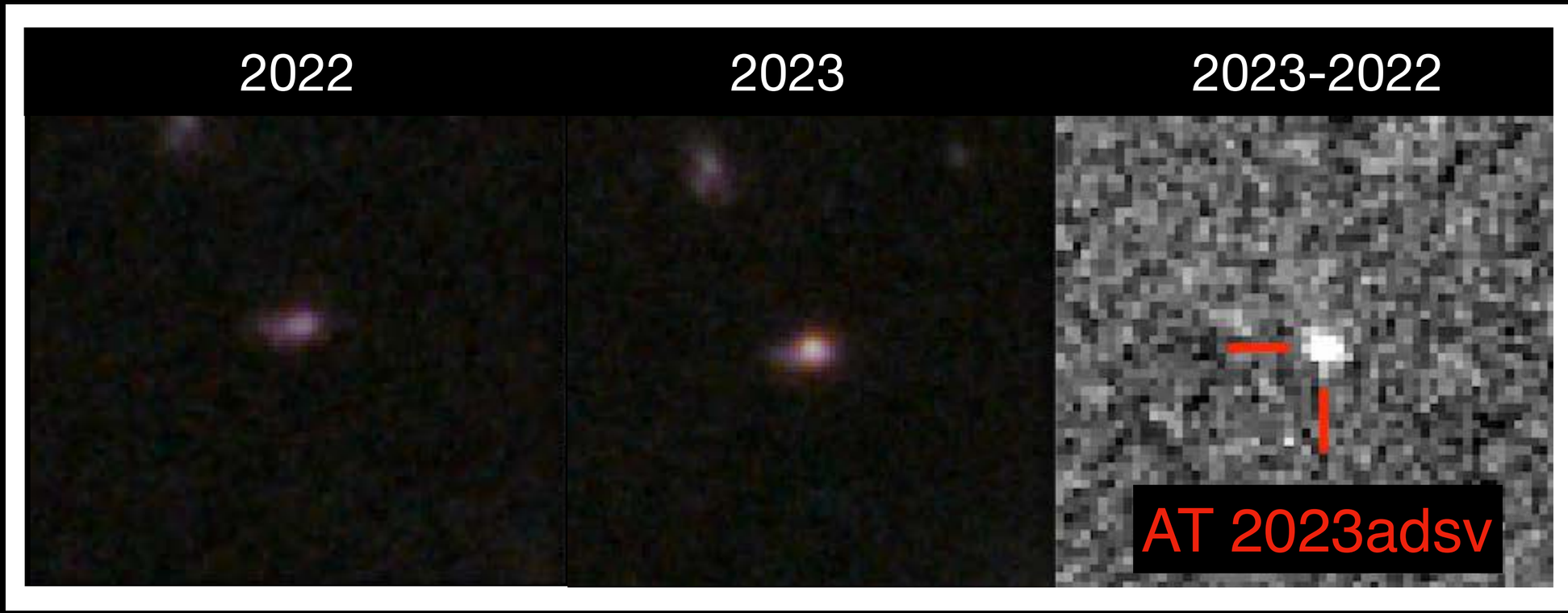

- Discovered at z=3.61
- Best modeled by massive star — 20x the mass of the Sun
- In an environment with 1/3 the heavy elements in the local Universe

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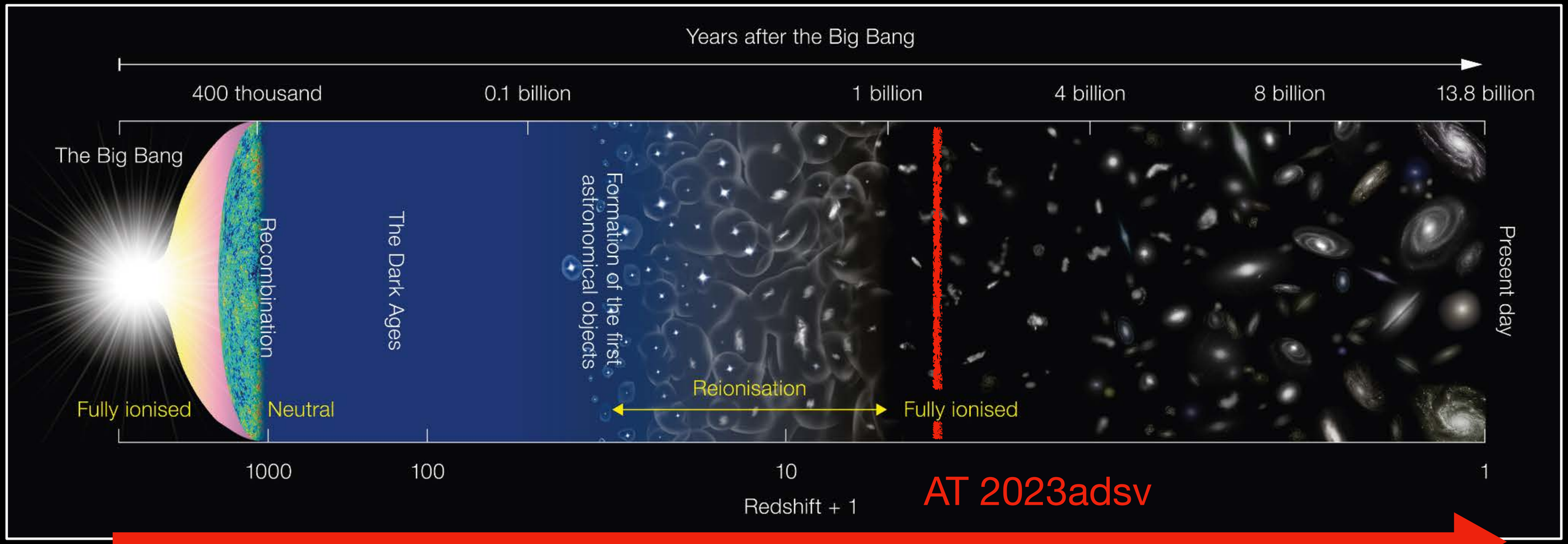
JWST is Leading the Charge to the First Stars



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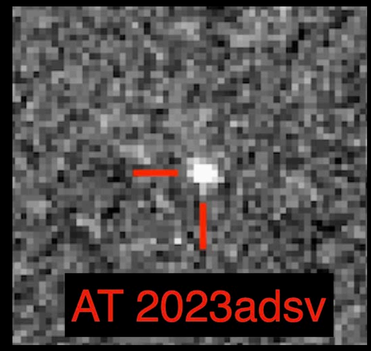
Take Aways



- *JWST* has revealed a supernova at z=3.6, in a *nearly* pristine environment, when the Universe was less than 2 billion years old

- This is major step toward finding explosions of the first stars

Contact: David Coulter
Space Telescope Science Institute

Paper:
Discovery of a likely Type II SN at z=3.6 with *JWST*

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