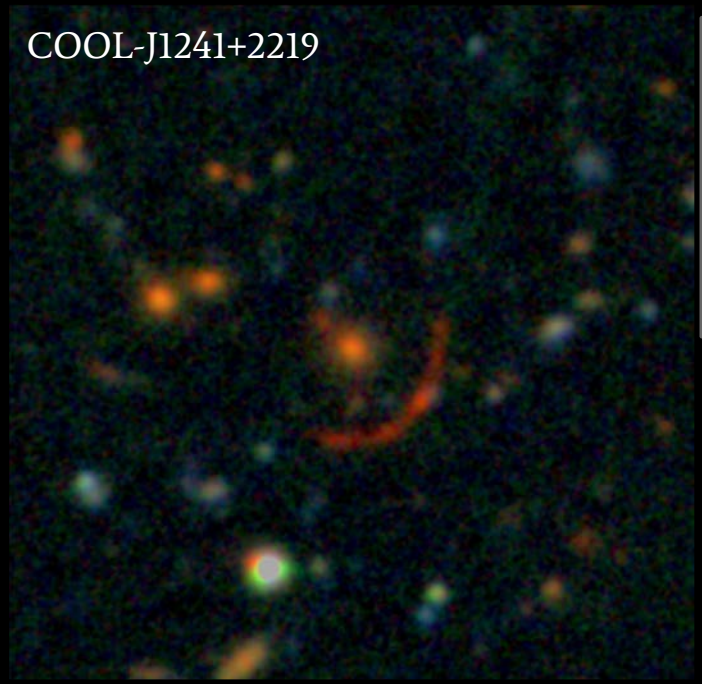
COOL-LAMPS

ChicagO Optically-selected Lenses - Located At the Margins of Public Surveys

THE UNIVERSITY OF CHICAGO
Department of Astronomy and Astrophysics

KICP

AAS 237



The Brightest Galaxy in the Redshift > 5 Universe

arXiv:2011.06601

Gourav Khullar
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@isskywalker,
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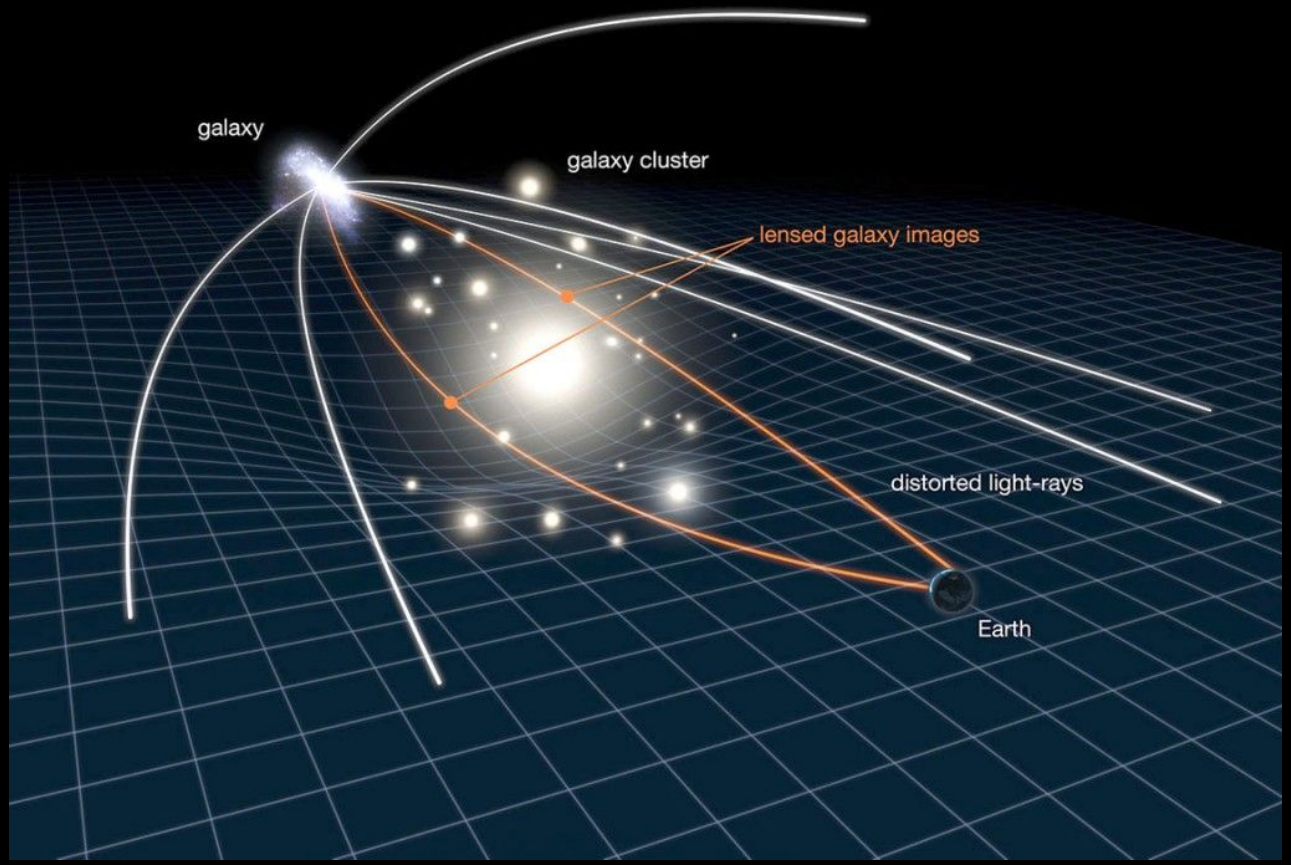
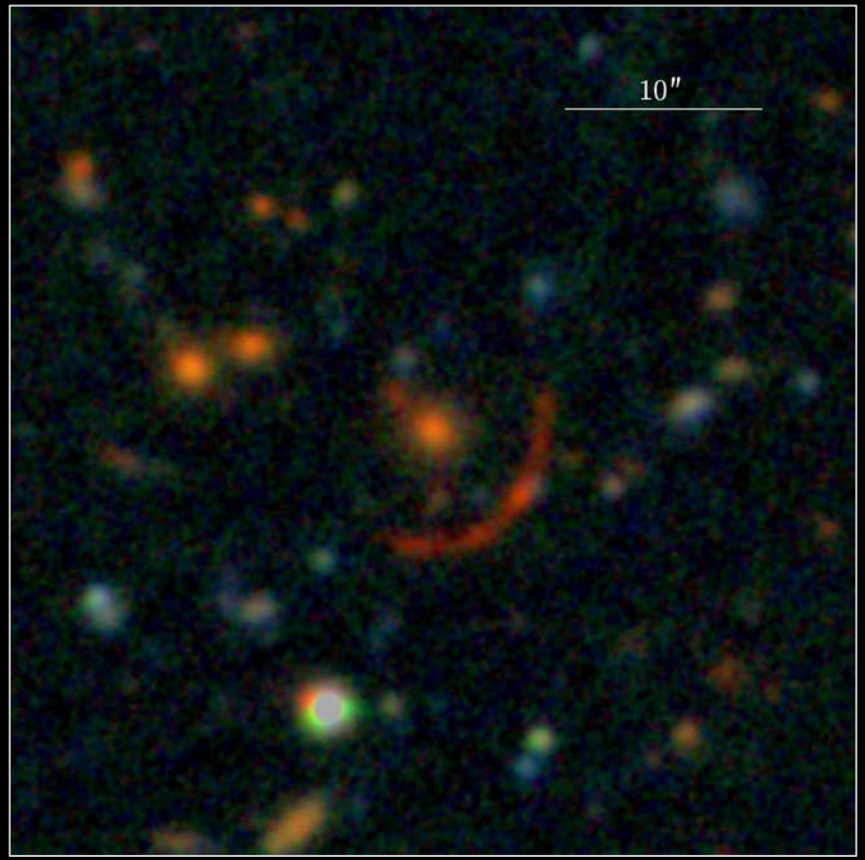
PhD Candidate, The University of Chicago
on behalf of the COOL-LAMPS collaboration

Gravitational lensing magnifies distant galaxies

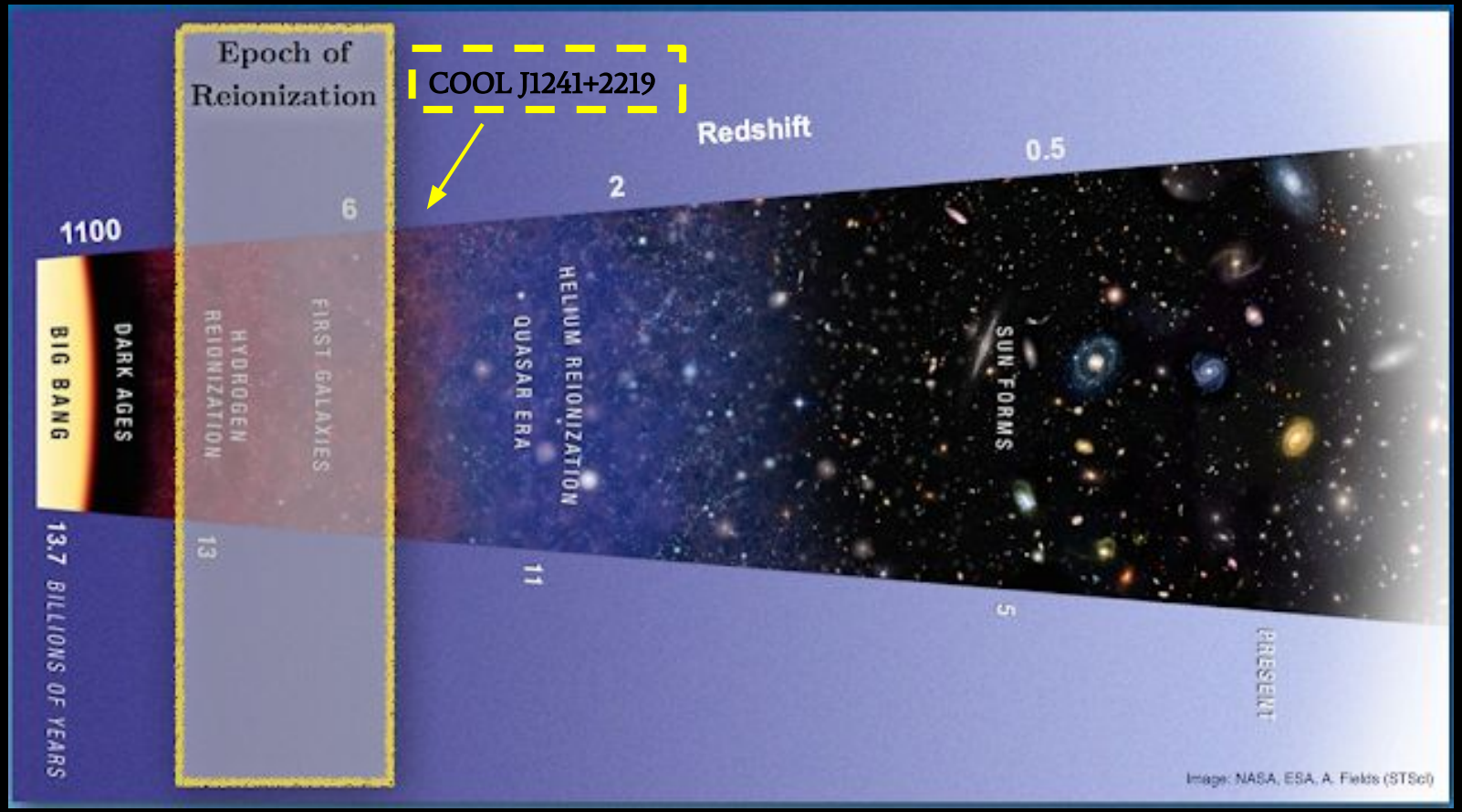


Credit:
NASA, ESA &
L. Calçada

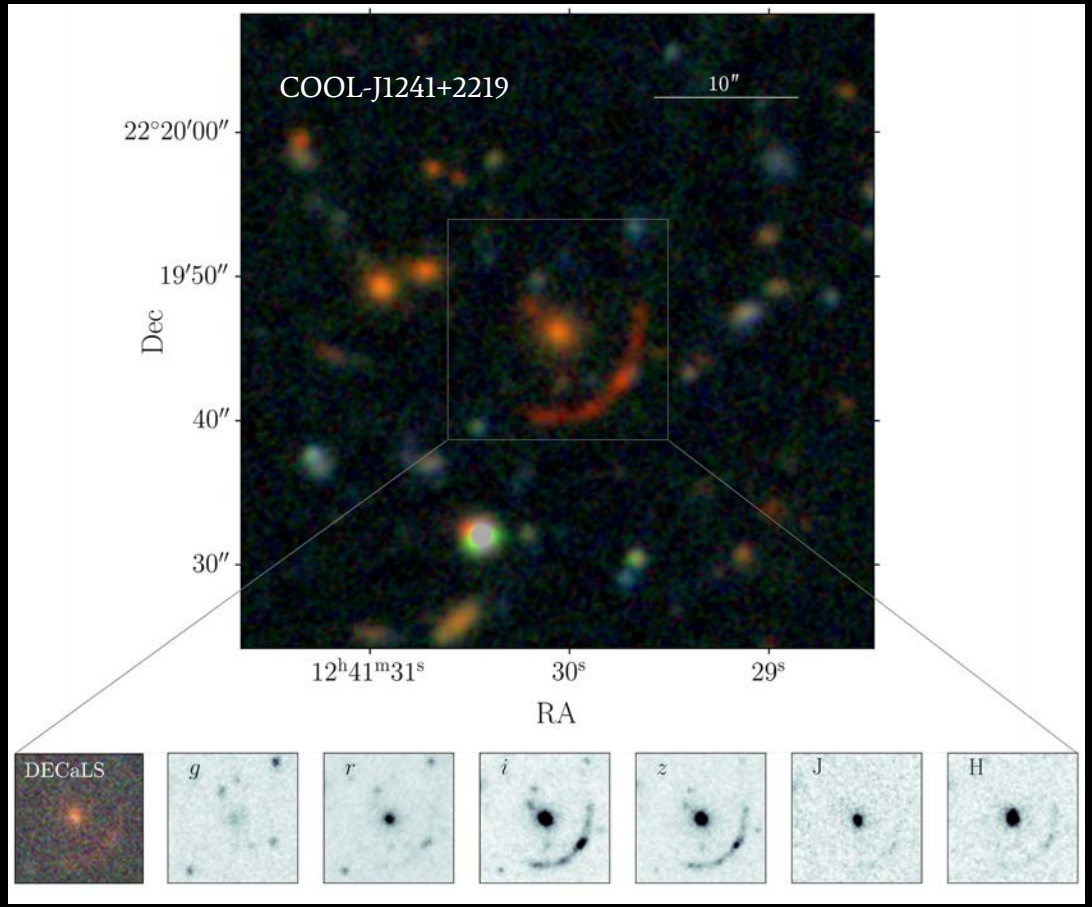
COOL J1241+2219 is the brightest galaxy observed from when the Universe was < 1.2 billion years old (<1/10th of its current age!)



A massive extremely bright galaxy near the epoch of reionization



COOL-LAMPS I. An Extraordinarily Bright Lensed Galaxy at Redshift 5.04; *Khullar et al. 2020 (accepted in The Astrophysical Journal, Nov 2020)*



Imaging from Magellan Telescopes (Chile)

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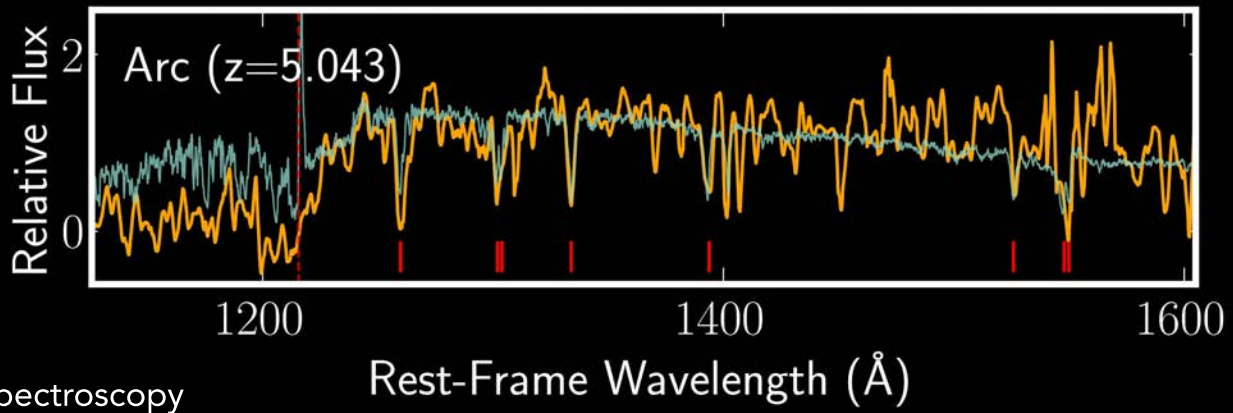

Spectroscopy from Magellan Telescopes (Chile) and Gemini-North Telescope (US)

Spectrum of the galaxy, confirming the redshift/distance (in orange), similar to template galaxy (in cyan)

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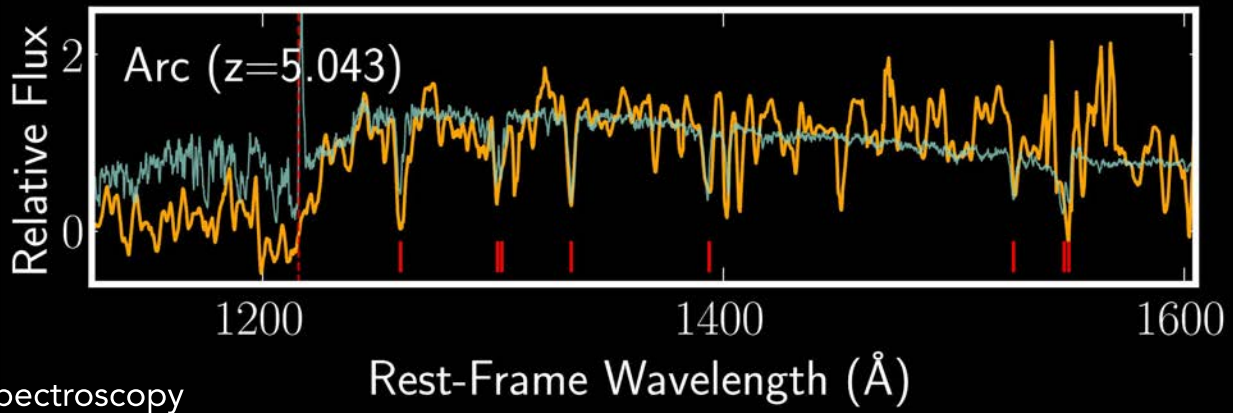

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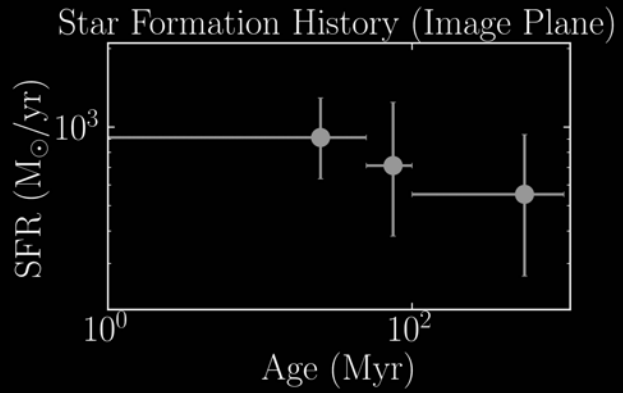
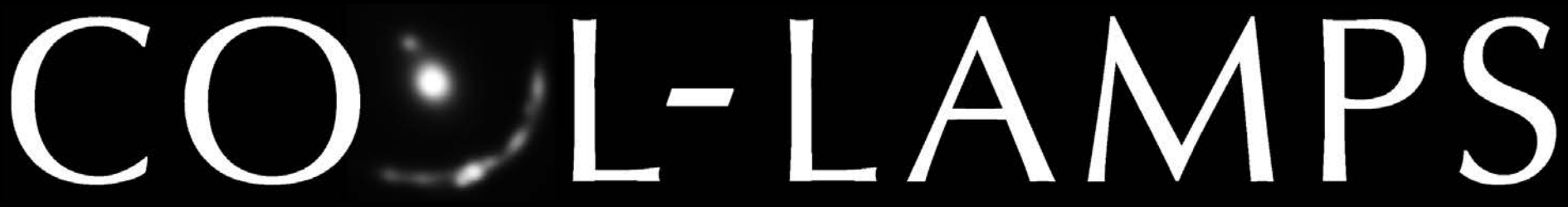


We model this galaxy using stellar population synthesis.

Consistent with a constantly star-forming galaxy, that has formed stars within a few times that of the Milky Way, in 1/10th the time, and at a much earlier time in the Universe!



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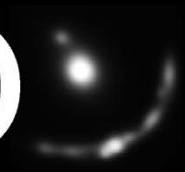
CO  L-LAMPS

ChicagO Optically-selected Lenses - Located At the Margins of Public Surveys

Finding strong gravitational lenses in recent public imaging data

Objects at the margins of the distributions of source color and brightness

Rapid visual examinations of ~0.5 million lines-of-sight

Central focus of undergraduate research class
at The University of Chicago

PI/Instructor: Mike Gladders
Teaching Assistant and lead graduate student: Gourav Khullar (me!)

11 undergraduate students at UChicago, 11 external collaborators at UMichigan, Center for Astrophysics (Harvard), Smithsonian Astrophysical Observatory, NASA Goddard, University of Cincinnati, University of Oslo

COOL-LAMPS at AAS

Check out the talks below:

240.06. COOL-LAMPS: Characterizing the brightest known galaxy in the redshift > 5 Universe (G Khullar, Tuesday 5:20 pm EST)

432.01. The COOL-LAMPS Collaboration: A proposed model for inclusive undergraduate teaching and research (G Khullar, Thursday 4:10 pm EST)

Paper link: arXiv:2011.06601

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Twitter: @isskywalker

347.01 Searching for lensed quasars in the COOL-LAMPS survey.
Publication in prep: *Michael Martinez, Mike Gladders..Gourav Khullar et al.*

347.02 Multi-wavelength characterization of COOL J1231, an early-type lensed galaxy at z = 1 to constrain mass, size and star formation history.
Publication in prep: *Ezra Sukay, Gourav Khullar, Mike Gladders et al.*