

Title: The Science of Galaxy Zoo, or What 250,000 astronomers can tell us about the Universe

Date: Apr 07, 2010 07:00 PM

URL: <http://pirsa.org/10040112>

Abstract: Since its launch in 2007, the website Galaxy Zoo (www.galaxyzoo.org) has become the largest astronomical collaboration in history, involving more than 250,00 volunteers in classifying galaxies. Humans outperform computers at this kind of visual classification, and the results from Galaxy Zoo have been spectacular. As well as reviewing the intimate connections between the delicate process of galaxy formation and the evolution of our Universe, this talk will include a review of the weird and wonderful objects identified by Galaxy Zoo users and a few tales from the ups and downs of citizen science.

The Science of



Chris Lintott

University of Oxford
Somerville College



THE ROYAL OBSERVATORY GREENWICH PRESENTS

SOLAR STORMWATCH

WHY SCIENTISTS NEED YOU
MISSION BRIEFING
SPOT & TRACK STORMS
TALK ABOUT IT

Solar scientists need you!
Help them spot explosions on the Sun and track them across space to Earth. Your work will give astronauts an early warning if dangerous solar radiation is headed their way. And you could make a new scientific discovery.

GET STARTED

WHY SCIENTISTS NEED YOU
Watch our solar scientists explain why your contributions are vital, and find out what they're doing with your results behind the scenes.

WATCH VIDEOS

MISSION BRIEFING
Explore our interactive mission briefing to get up to speed with solar science, zoom in on the STEREO spacecraft and meet our science team.

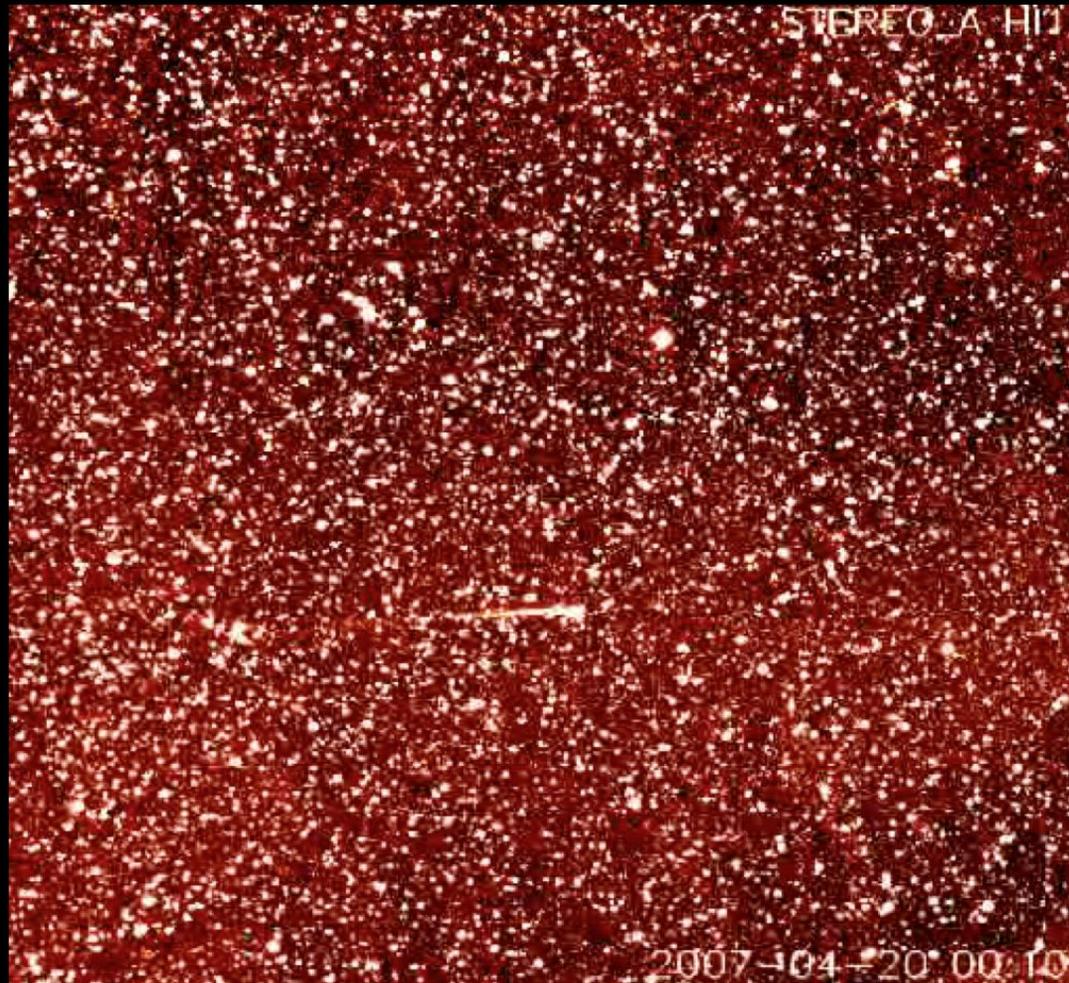
VISIT MISSION BRIEFING

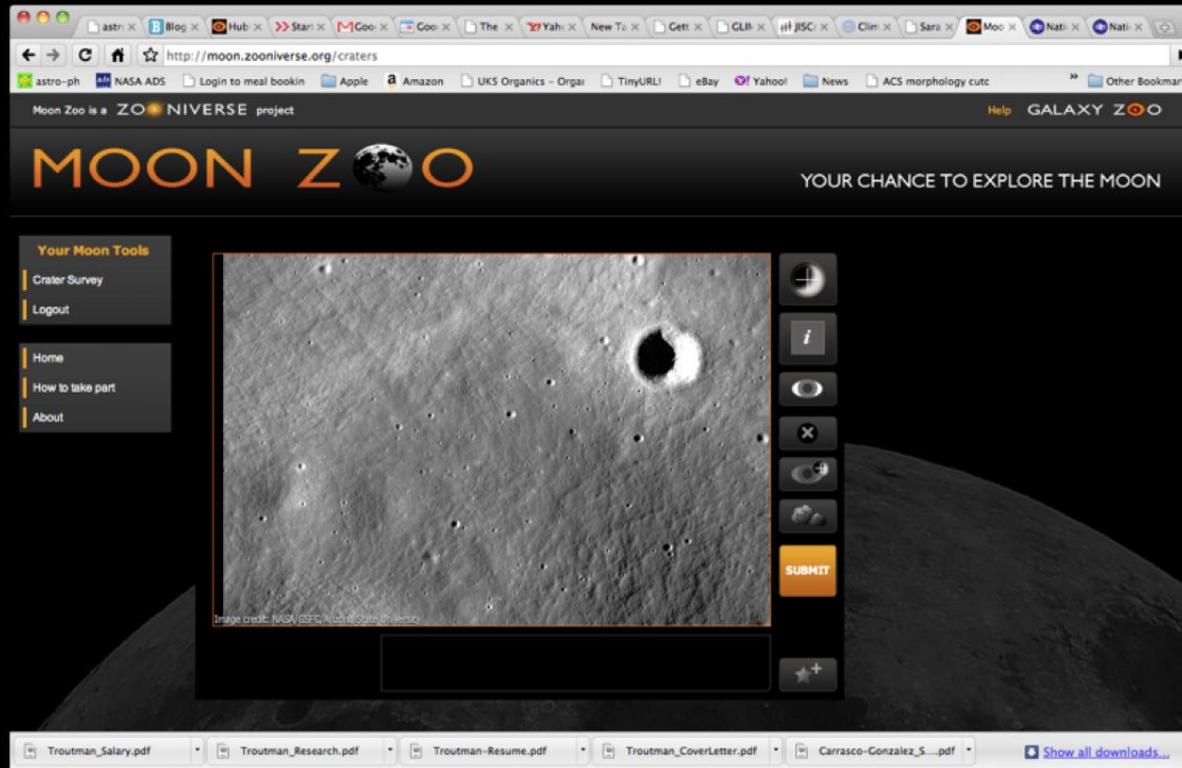
Featured member
Jo Echo Syan
Member since: February 2009
The cool thing is, I am welcome, allowed to ponder, be amazed and explore not only a subject previously inaccessible to me, but it has also enabled me to respond and take a new approach to my work as an Artist.
Achievements

Log in

www.solarstormwatch.com



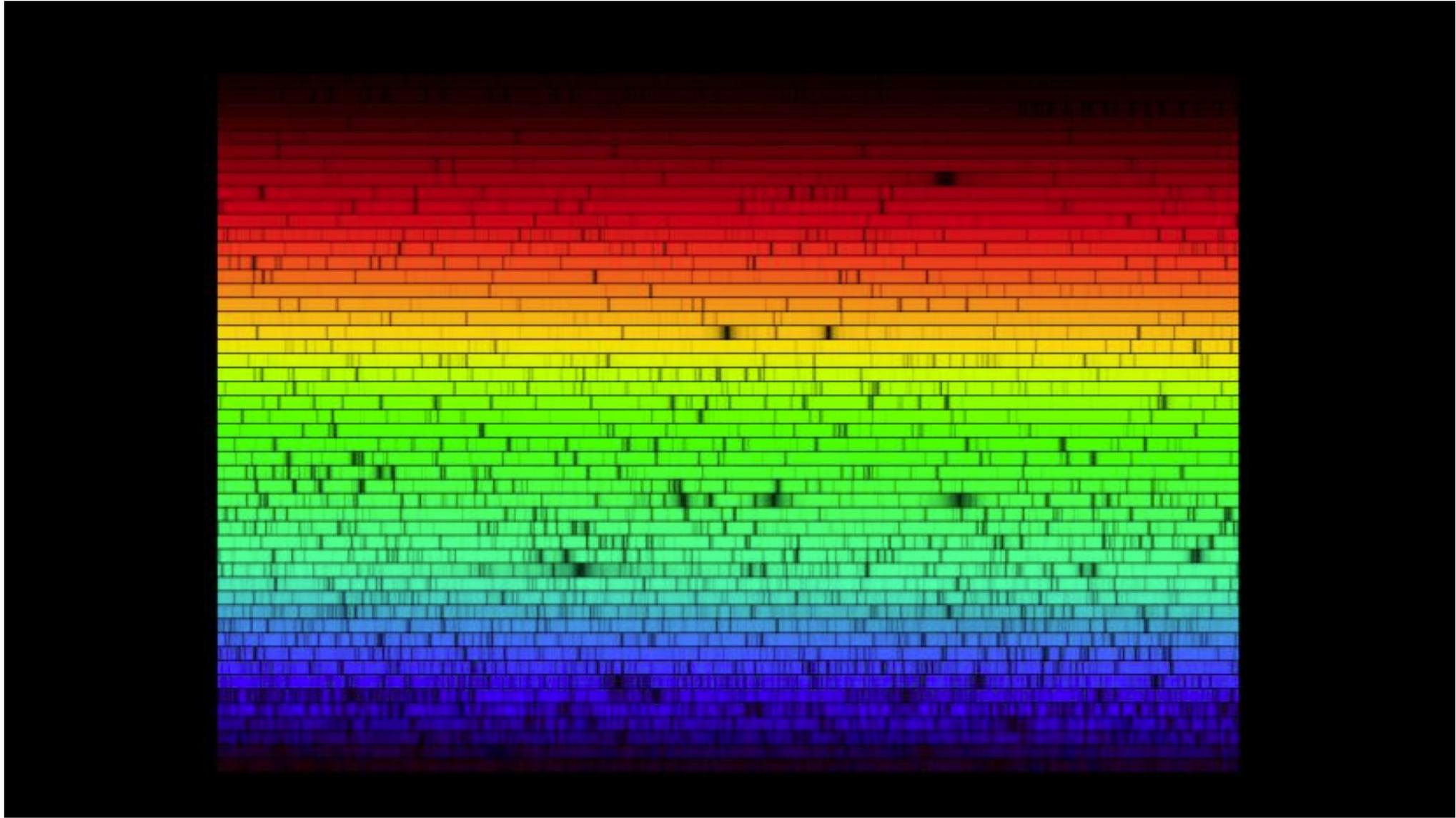


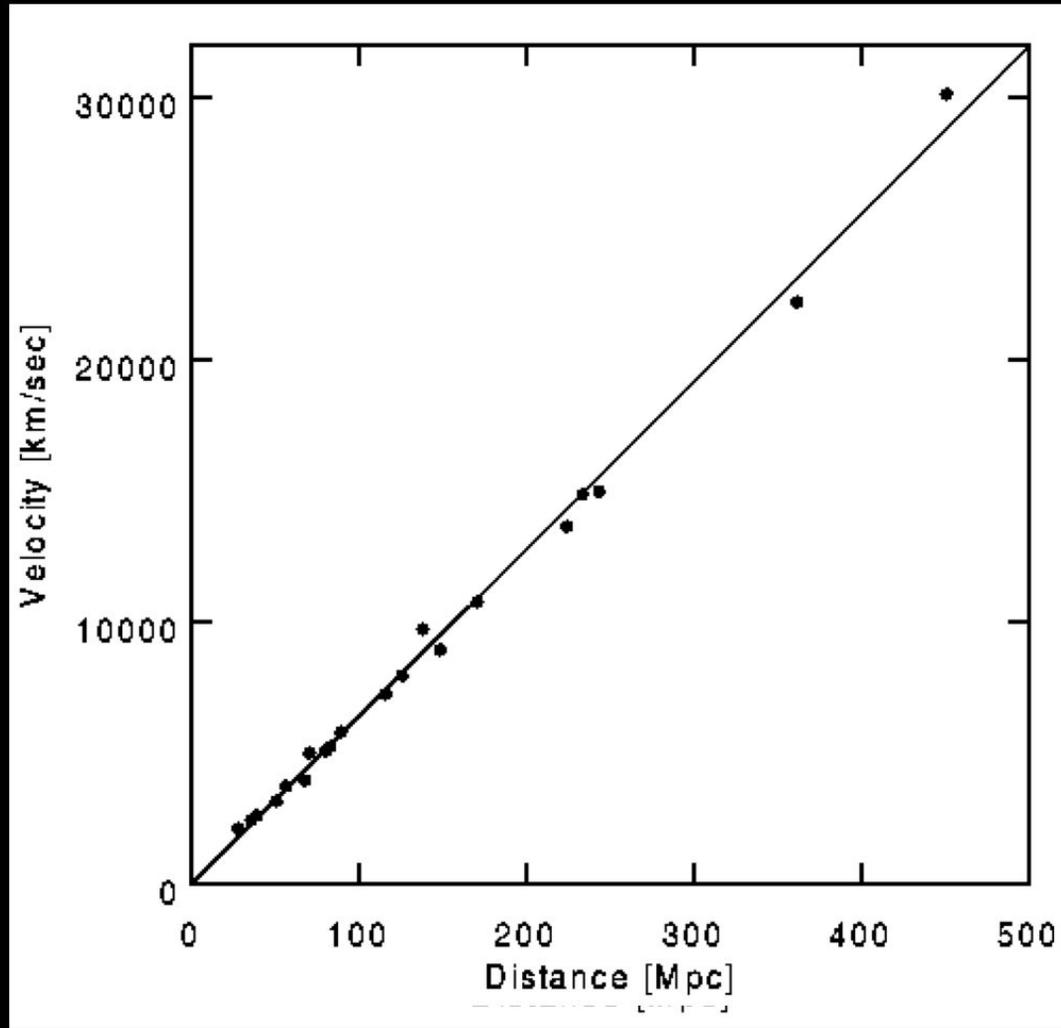


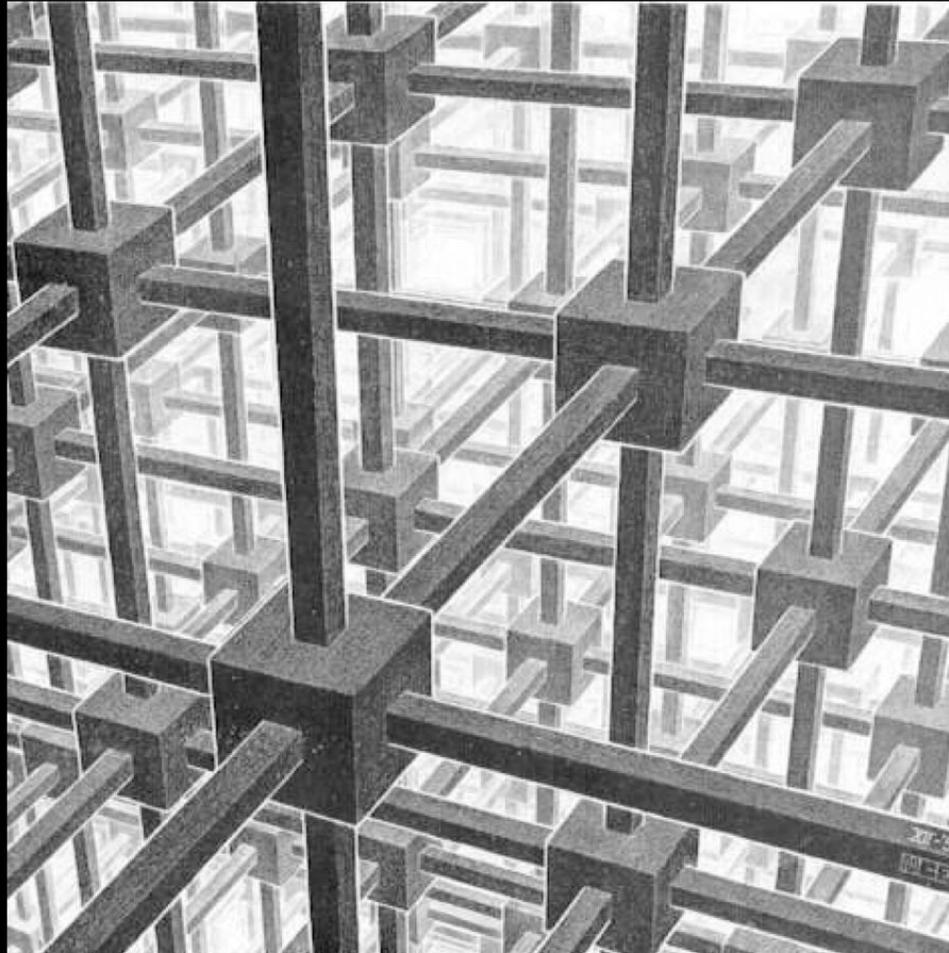
<http://moon.zooniverse.org>
(But keep it to yourself!)

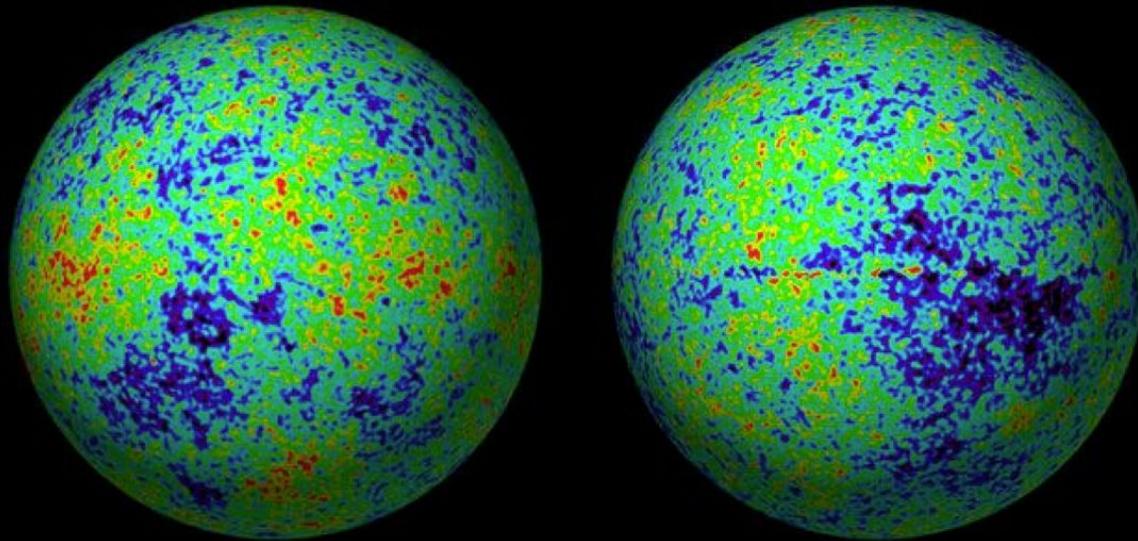


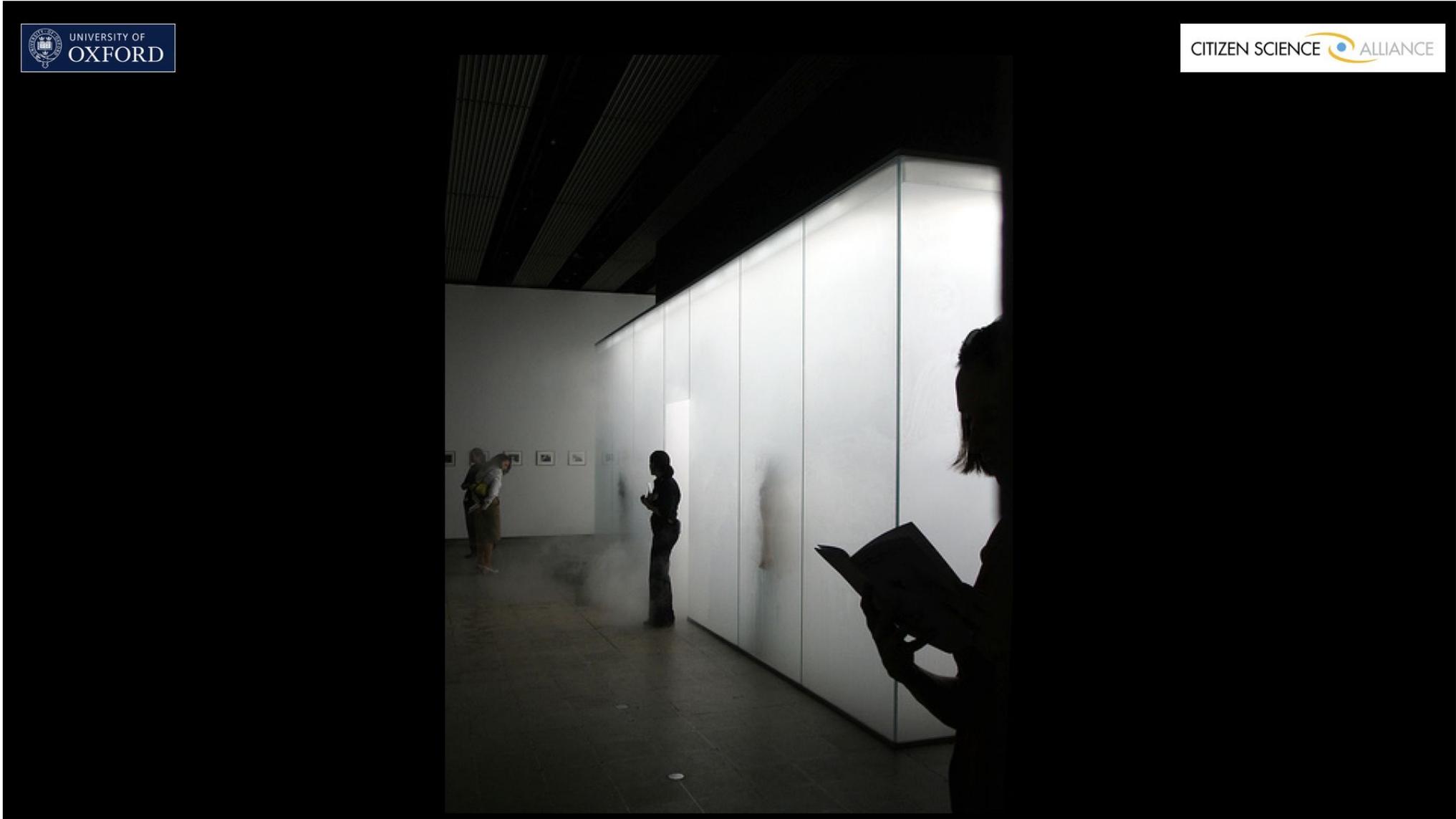


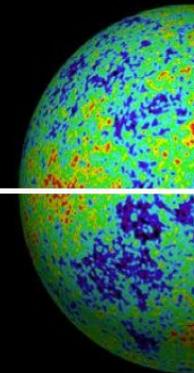
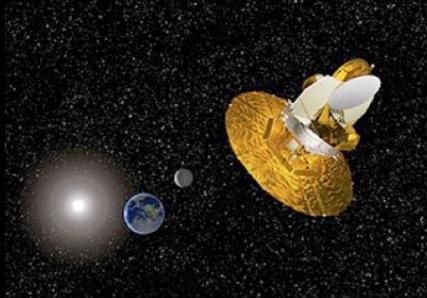










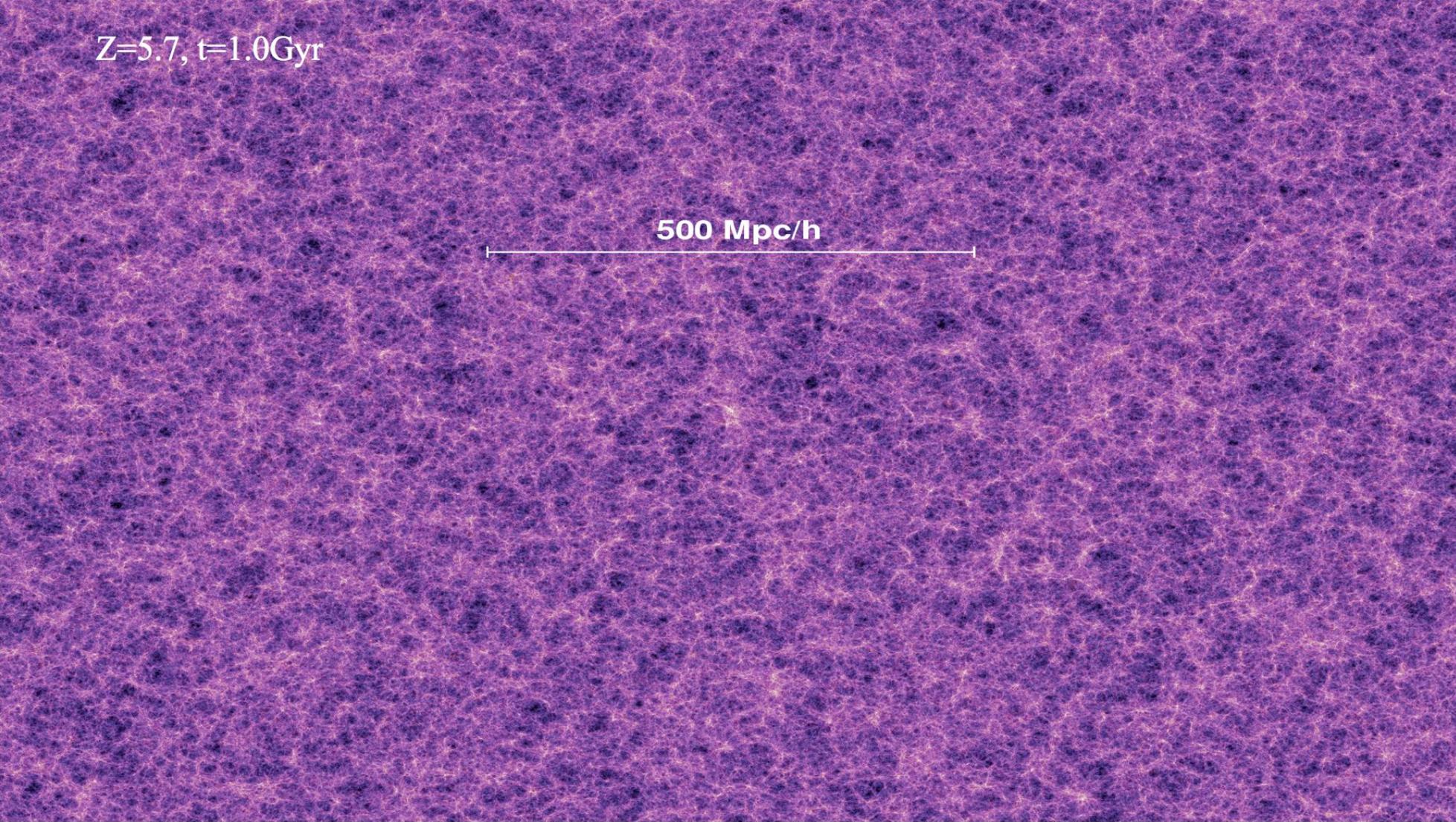


$Z=18, t=0.015\text{Gyr}$

500 Mpc/h

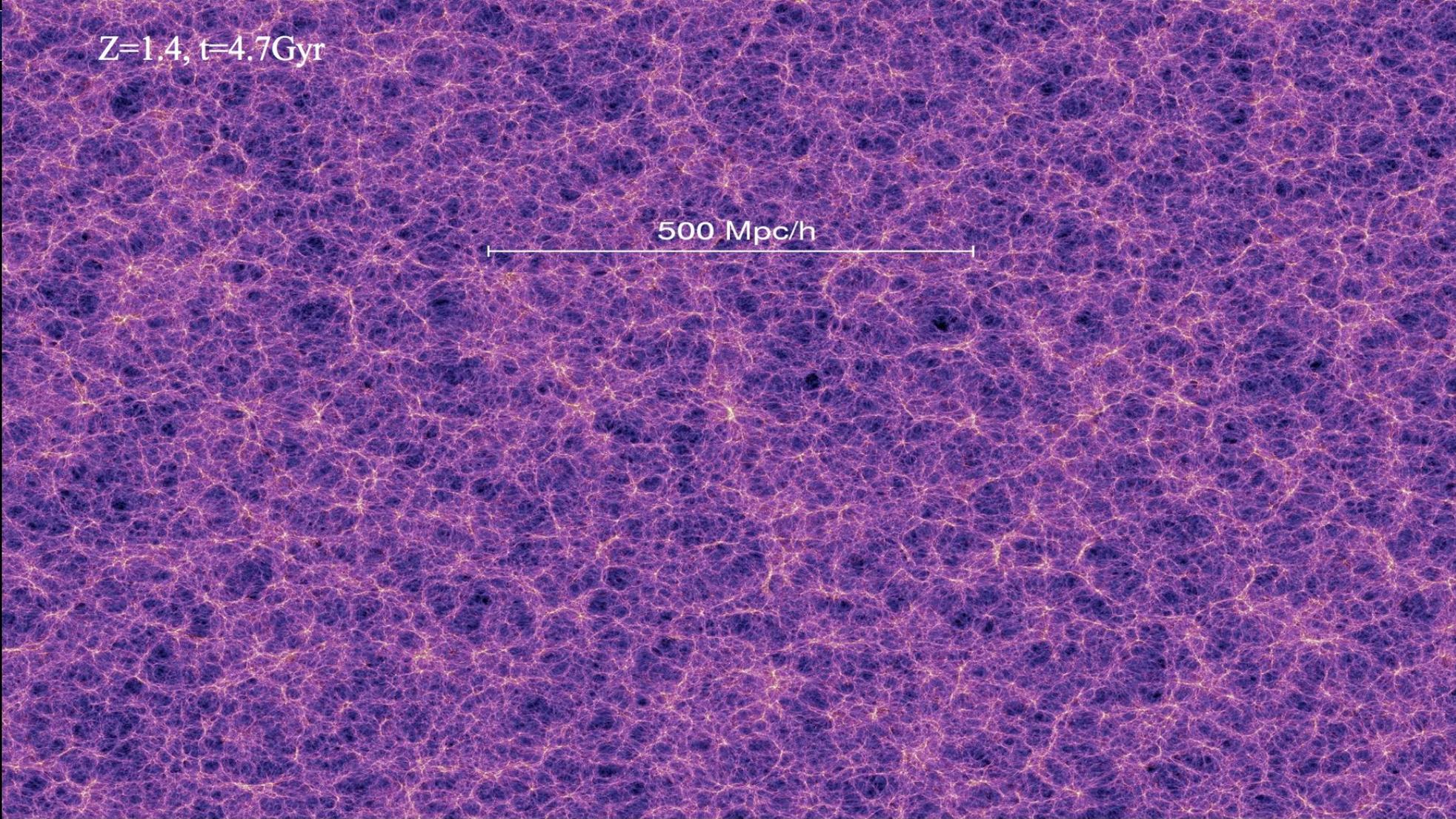
$Z=5.7, t=1.0\text{Gyr}$

500 Mpc/h



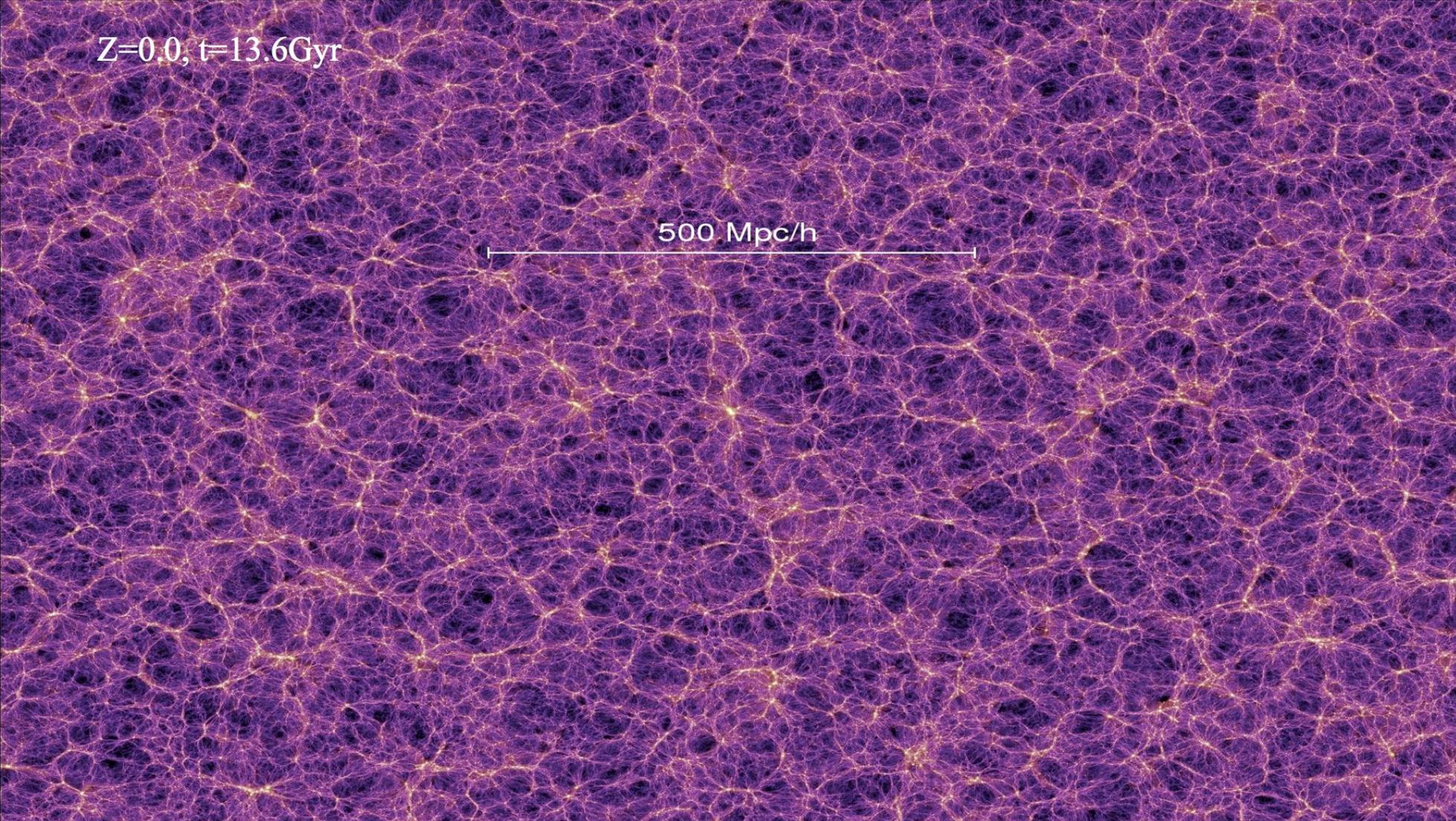
$Z=1.4, t=4.7\text{Gyr}$

500 Mpc/h

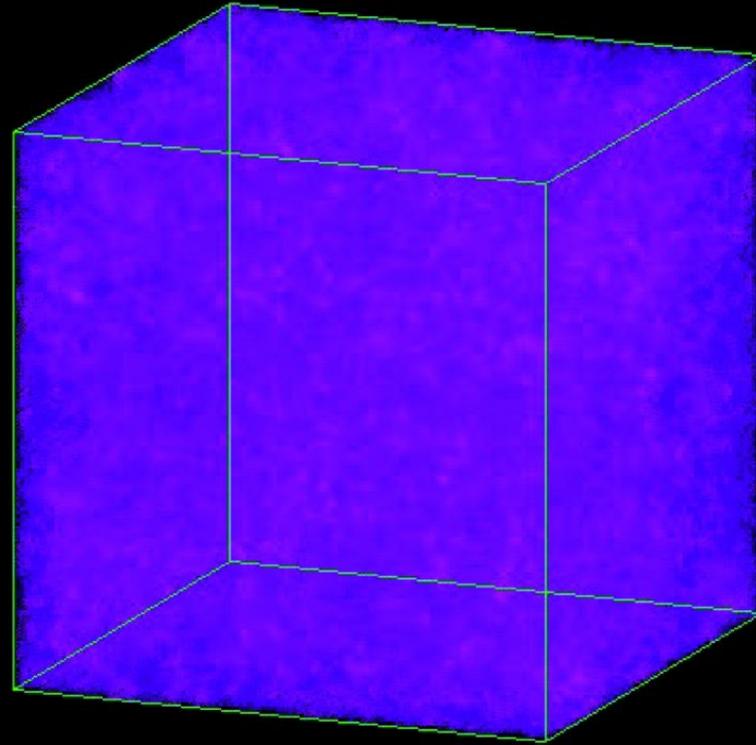
A visualization of the cosmic web at redshift $Z=1.4$ and time $t=4.7$ Gyr. The image displays a complex, interconnected network of filaments and nodes, rendered in shades of purple and yellow. The filaments form a dense, web-like structure that fills the entire frame. A scale bar in the center indicates a length of 500 Mpc/h. The overall appearance is that of a highly structured, interconnected network of matter.

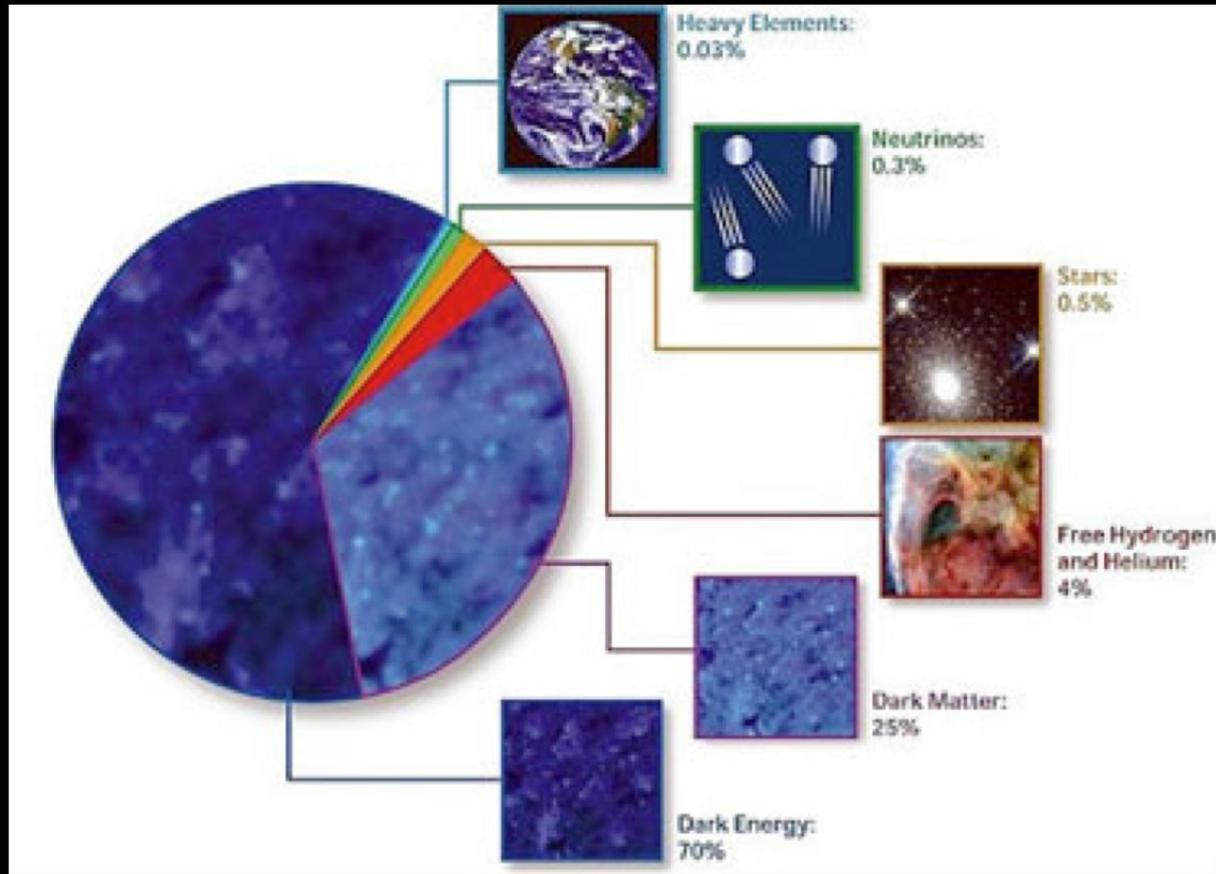
$Z=0.0, t=13.6\text{Gyr}$

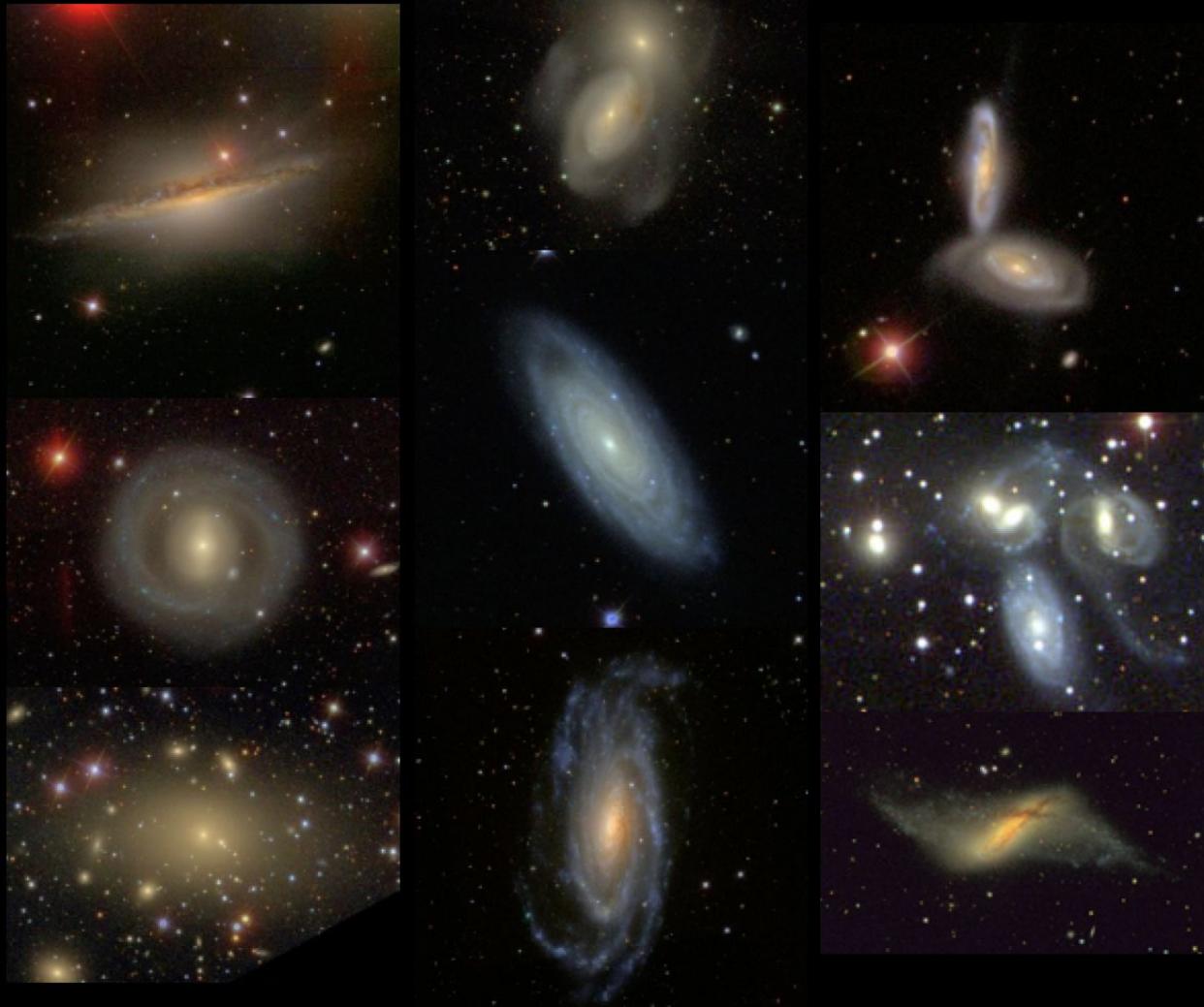
500 Mpc/h

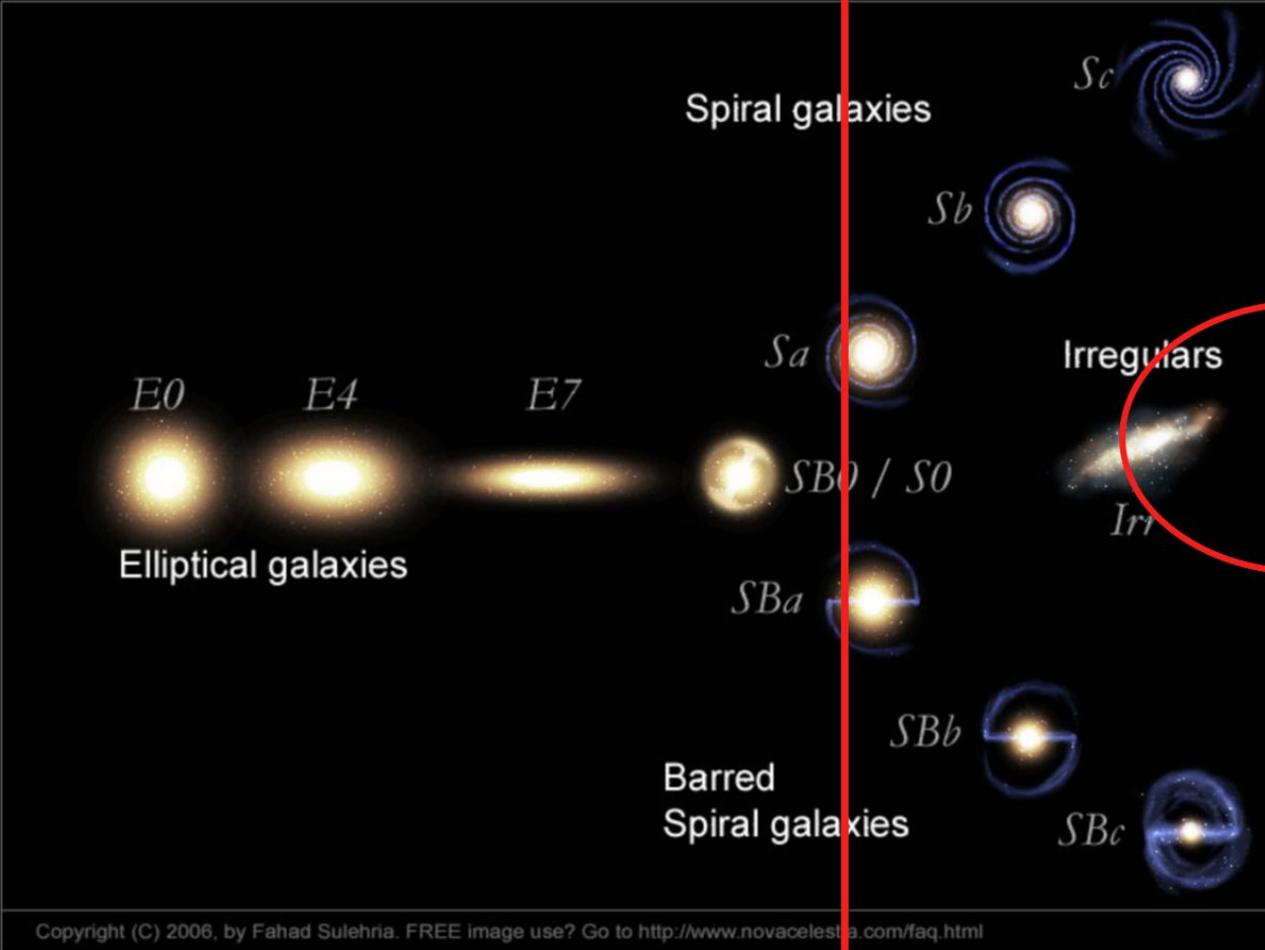
A visualization of the cosmic web at redshift Z=0.0 and time t=13.6 Gyr. The image shows a dense network of filaments and nodes, with a scale bar indicating 500 Mpc/h.

15.67









GALAXY ZOO.org

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Galaxy Tutorial

Galaxy Analysis

Galaxy Analysis

Welcome to Galaxy Zoo's view of the Universe. If you're here you should already have seen the **Tutorial**, but feel free to go and remind yourself. There's no need to agonise for too long over any one image, just make your best guess in each case.



Show Grid Overlay on the next Image

Galaxy Ref:
588010880371851294

Choose the Galaxy Profile by clicking the buttons below



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Stories

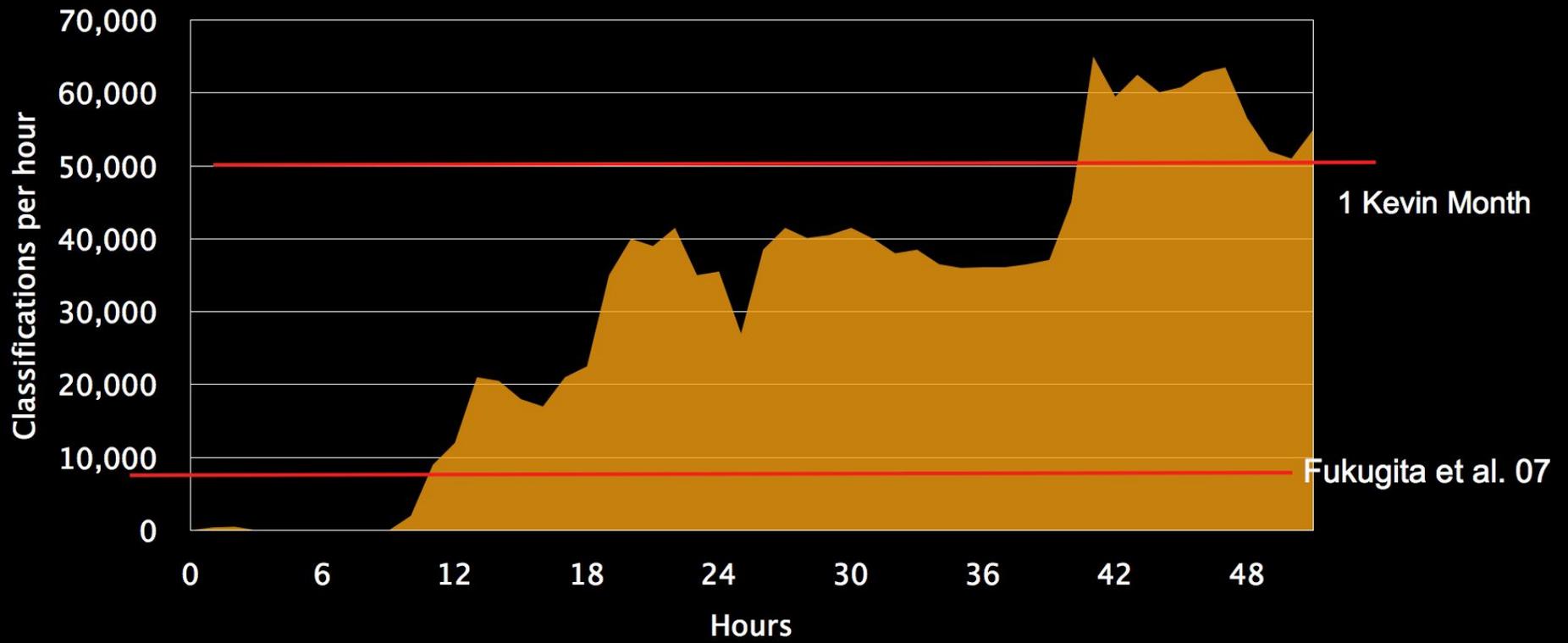
MOST POPULAR STORIES NOW

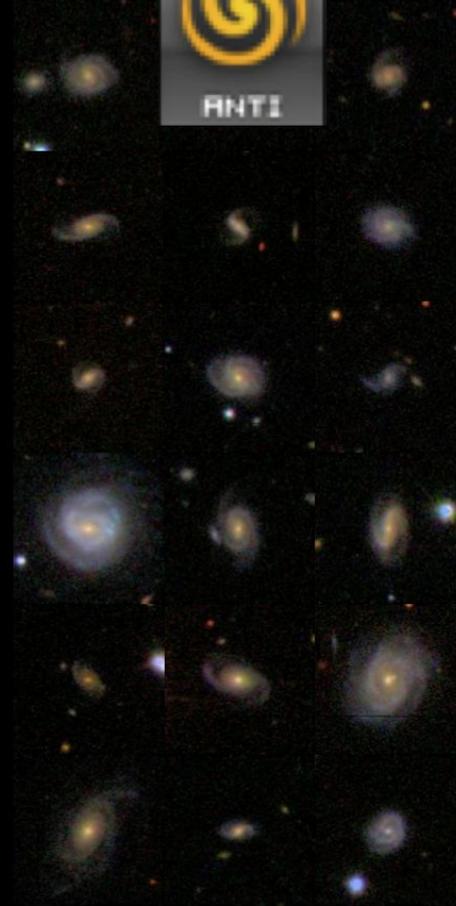
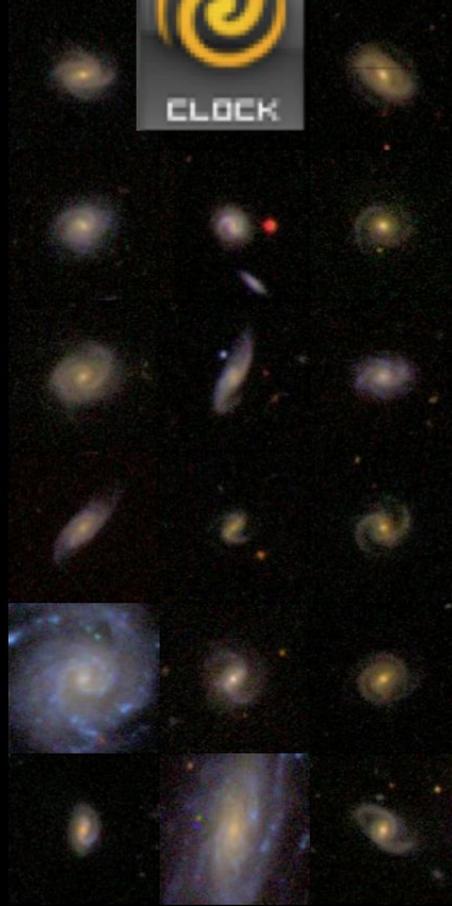
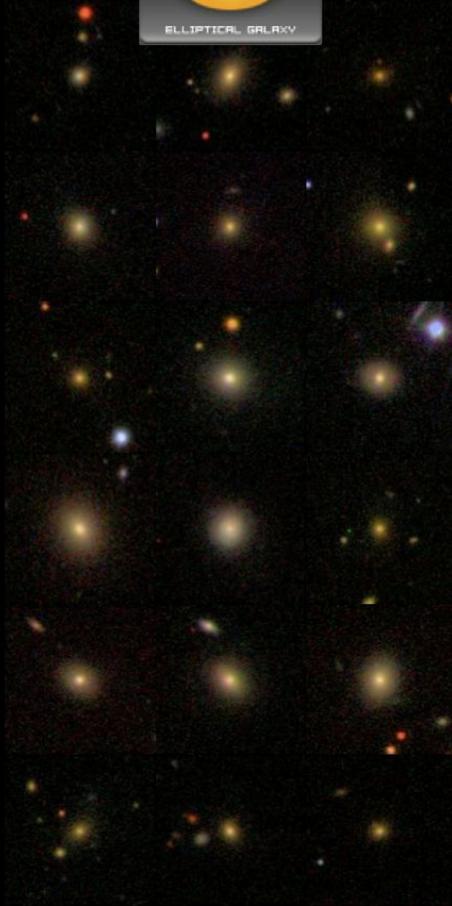
MOST E-MAILED

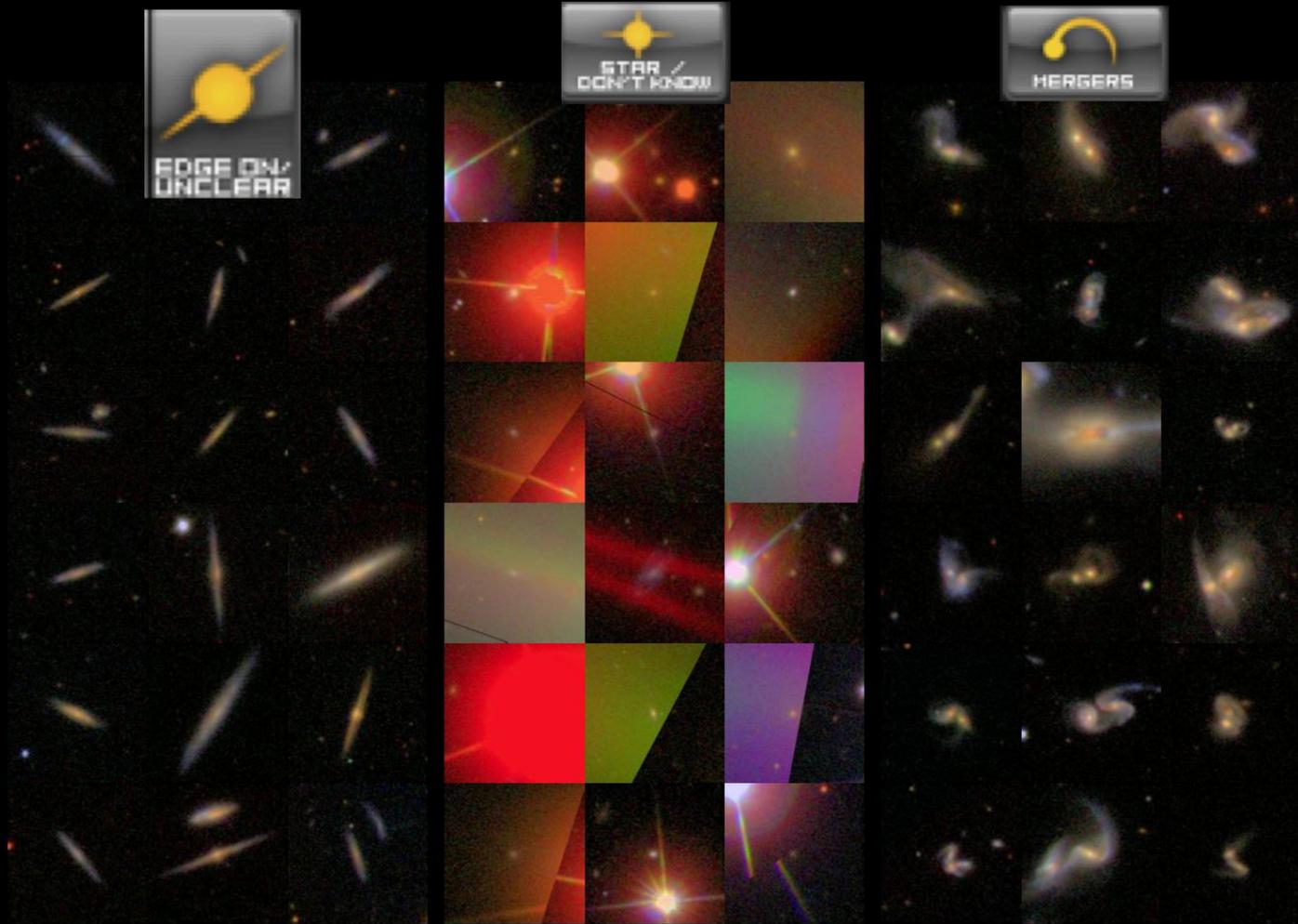
MOST READ

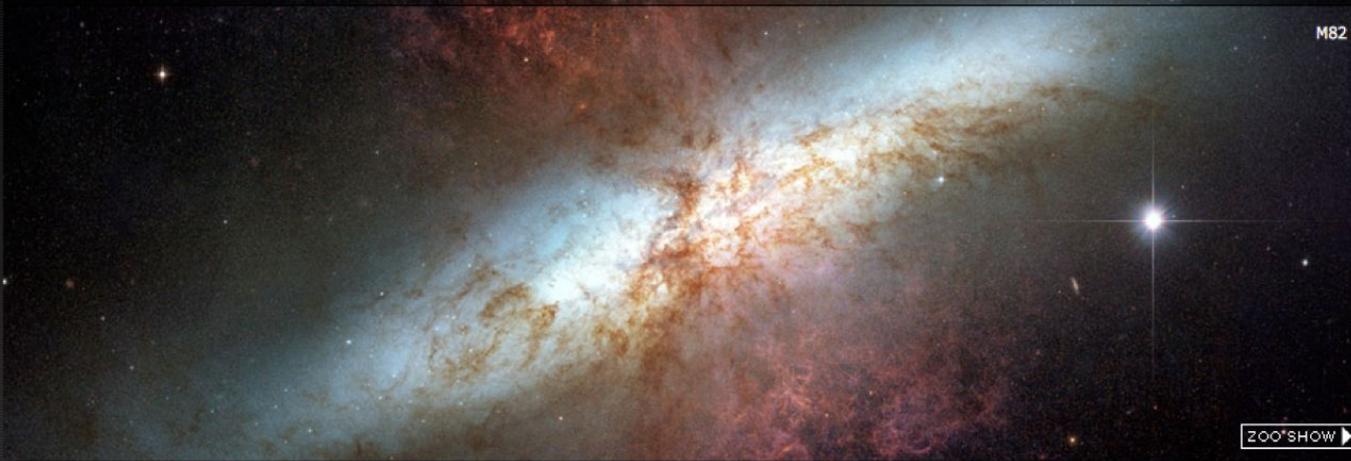
- 1 Moles 'good indicator to ageing'
- 2 Huge dog is reluctant media star
- 3 Scientists seek galaxy hunt help
- 4 'My mother held me down'
- 5 Man flies to wedding a year early

▶ Most popular now, in detail









Welcome to Galaxy Zoo, where you can help astronomers explore the Universe

The Galaxy Zoo files contain almost a quarter of a million galaxies which have been imaged with a camera attached to a robotic telescope ([Sloan Digital Sky Survey](#), no less). In order to understand how these galaxies – and our own – formed, we need your help to classify them according to their shapes – a task at which your brain is better than even the fastest computer.

More than 150,000 people have taken part in Galaxy Zoo so far, producing

Classifier Log In

Username:

Password:

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Classify Galaxies

Answer the question below using the buttons provided.

Is the galaxy simply smooth and rounded, with no sign of a disk?



Smooth



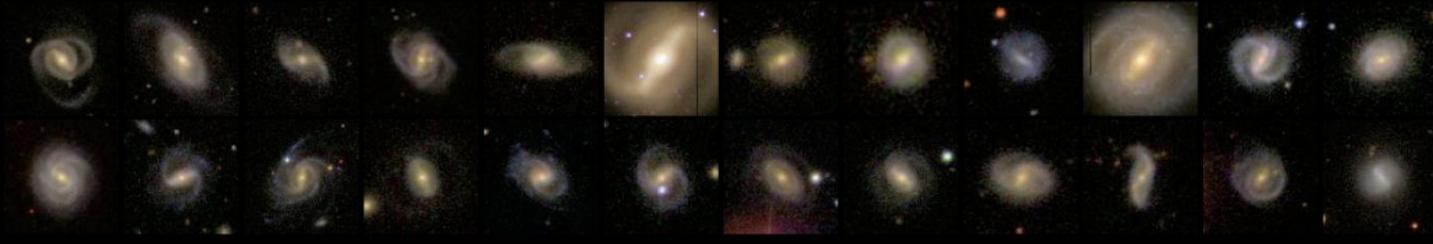
Features or
Disk



Star or
Artifact

A: Bar

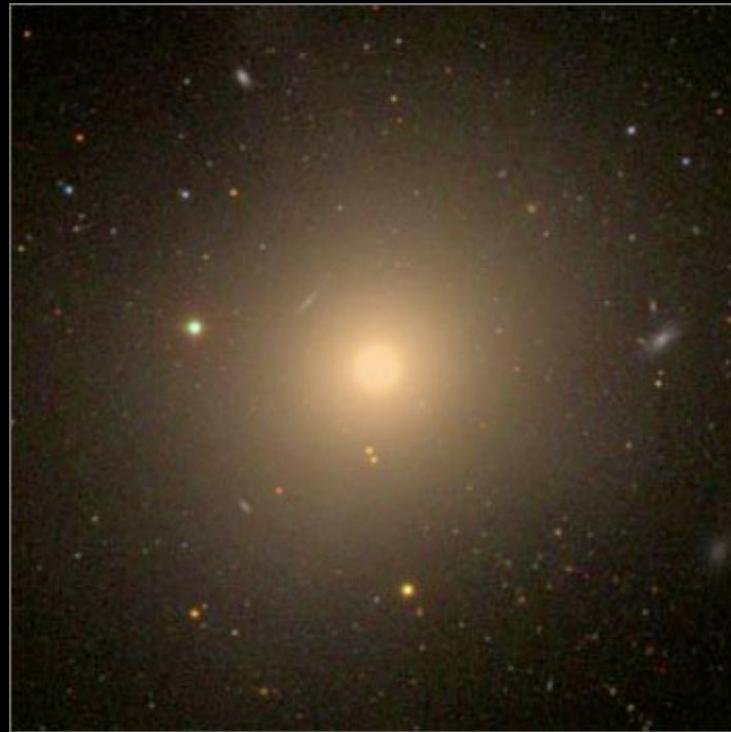
more examples...



A: No Bar

more examples...

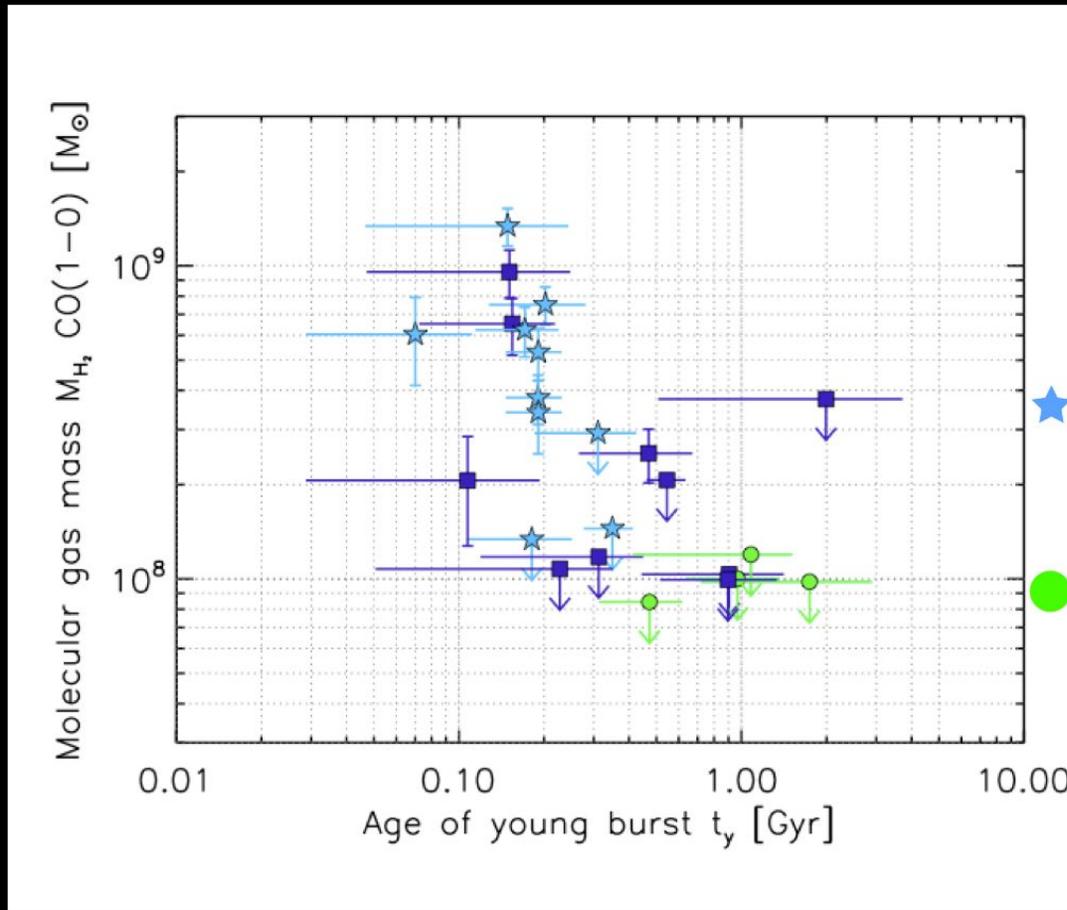




Blue ellipticals : ~250 local galaxies



Star Formation Rate between 0.5 and 50 (!) solar masses per year
Milky Way ~ 1 solar masses per year



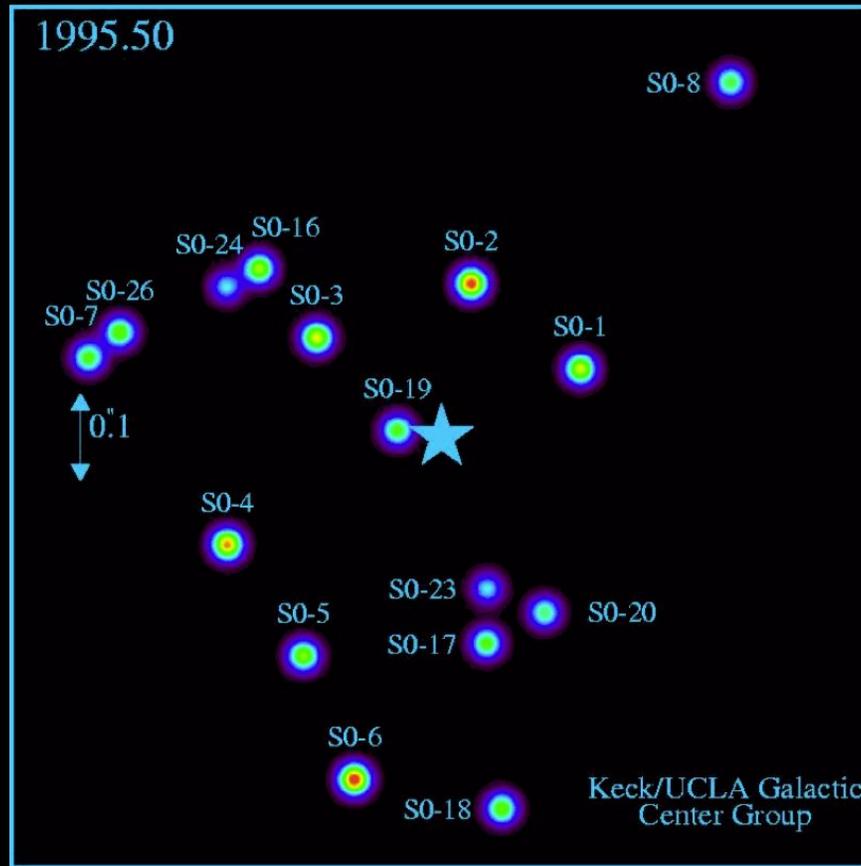
Galaxies coloured according to emission lines which indicate the presence of :

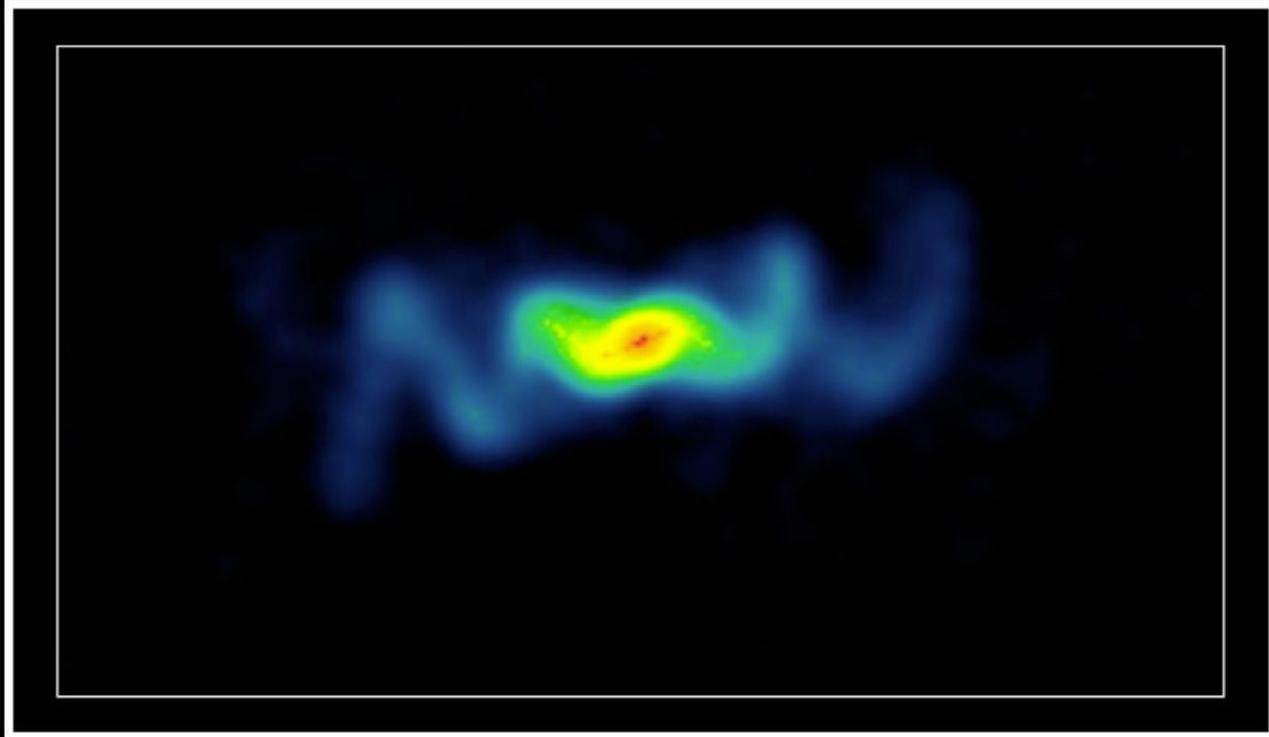
Star Formation

Star Formation and black hole activity

Black hole dominant

Results : Schawinski, Lintott et al. 08







Hanny's Voorwerp







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GALAXY ZOO.org

Official Galaxy Zoo Forum

Hello **zookeeperChris**

Show unread posts since last visit.

Show new replies to your posts.

Total time logged in: 3 days, 19 hours and 4 minutes.

News: Welcome to anyone looking for info on Hanny's Voorwerp - you can find more info in the [First Posts](#) thread and the [Introductory board](#). New members please check out the [First Posts](#) thread and the [Introductory board](#).

HOME | HELP | SEARCH | ADMIN | PROFILE | MY MESSAGES | MEMBERS | LOGOUT

Galaxy Zoo Forum

Welcome to Galaxy Zoo



Threads to help you find your way around Galaxy Zoo

Please read the starred threads before posting.
Moderators: [Infinity](#), [Alice](#), [Hanny](#)

The objects



Object of the Day

The Galaxy Zoo team nominate their Object of the Day. Please do not post your own objects in threads here - use the [Object of the Day](#) thread.



Stunning sights!

Post the most beautiful objects here. Remember to include a description.



Weird and wonderful

Post curiosities here. Please remember to include a description.

The site and the science



Latest News from Galaxy Zoo

We will use this board to occasionally publish some noteworthy News Items or Press Events relating to Galaxy Zoo. These will also feature on the main web site.



Suggestions and Comments

about the project and website



Science Questions

The why and what of Galaxy Zoo

August 17, 2008, 11:13:19 PM

102 Posts
10 Topics

Last post by Alice
In Re: Posting Images - wha...
on August 15, 2008, 09:40:06 PM

3452 Posts
313 Topics

Last post by Alice
In Re: Sunday 17th August 2...
on Today at 10:45:31 PM

46877 Posts
1478 Topics

Last post by Liberatus
In Re: Ring Galaxy thread
on Today at 11:05:48 PM

48774 Posts
6532 Topics

Last post by Liberatus
In Re: Post one armed Galax...
on Today at 11:02:44 PM

2048 Posts
43 Topics

Last post by Jules
In Re: NEW! Galaxy Zoo scie...
on Today at 09:42:26 PM

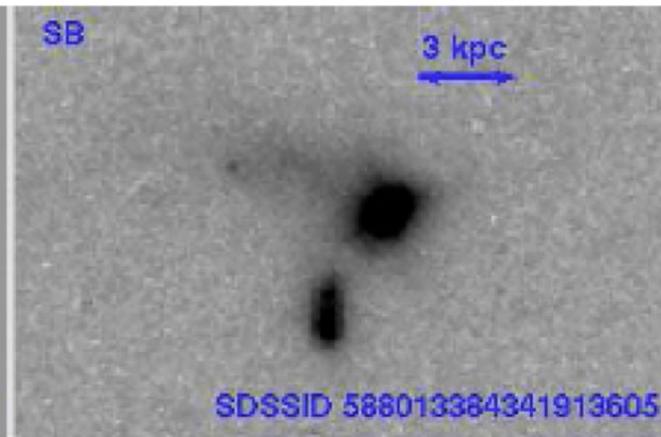
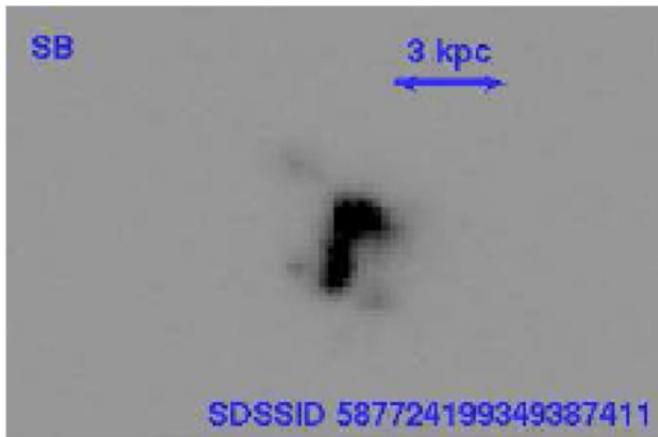
3094 Posts
297 Topics

Last post by lahensuge
In Re: UNDO BUTTON!!!
on Today at 09:56:50 PM

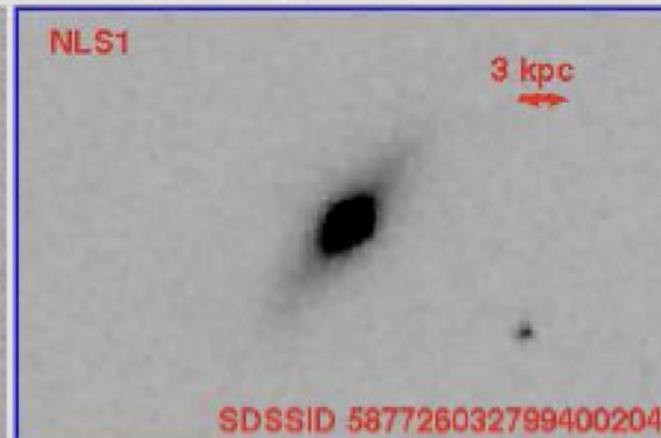
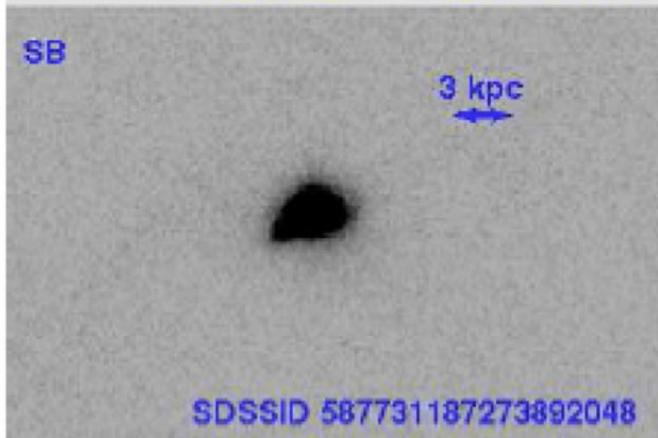
3538 Posts
352 Topics

Last post by zookeeperChris
In Re: What do all these nu...
on Today at 06:18:06 PM

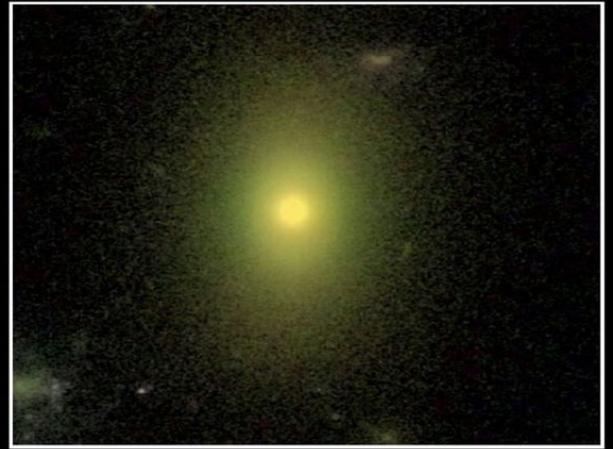
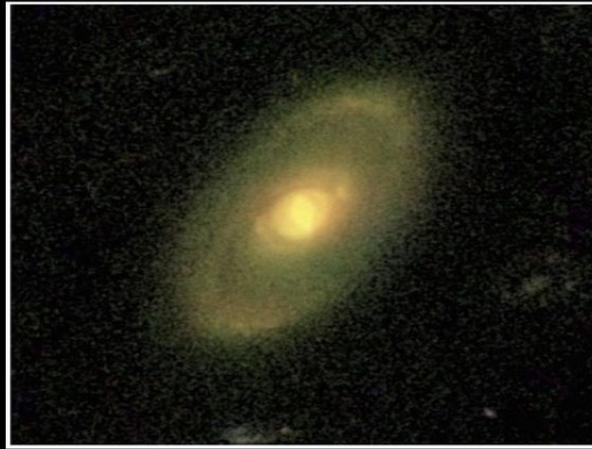
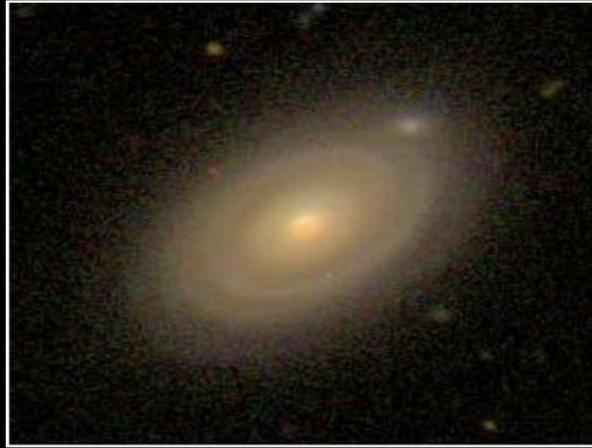
HST



SDSS



Galaxy Zoo : SDSS



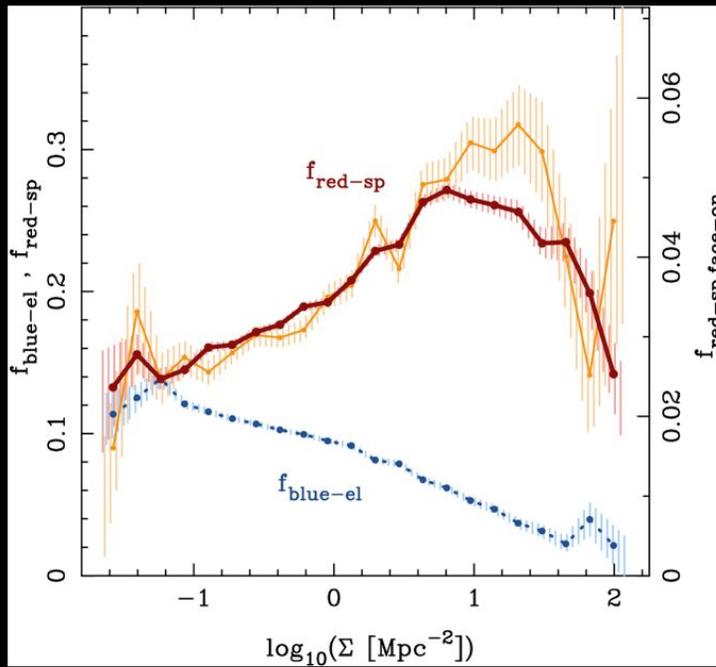
STAGES : Hubble Space Telescope

Wolf et al : astro-ph/0811.3873

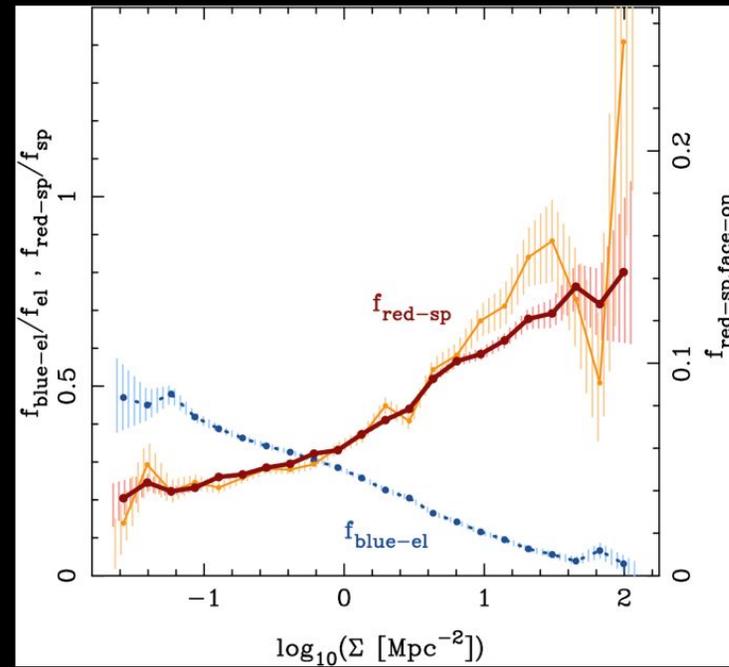
Red spirals

- Red spirals account for ~1/3 of galaxies at some densities

fraction of all galaxies



fraction of morphological type

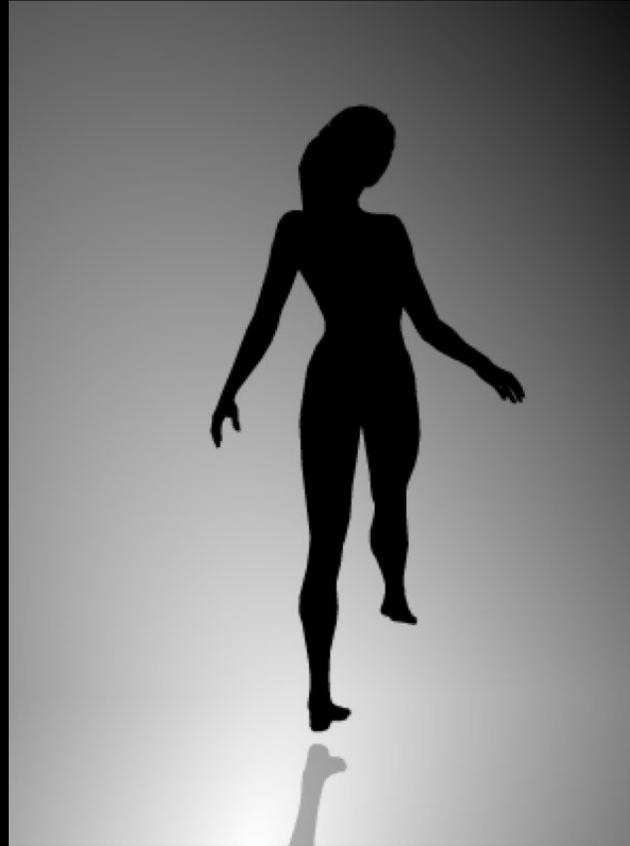


Bamford et al., 09, Masters et al. 10

Longo (astro-ph/0707.3793) finds an excess of anticlockwise spirals



So do we...



Galaxy Zoo Mergers - Merge

http://mergersbeta.galaxyzoo.org/classify

Google

astro-ph NASA ADS Login to me... king system Apple (99) UKS Organic... y to London TinyURL! eBay Amazon Yahoo! Aim point RA... +15°2'16" News (1121)

Sloan Digital Sky Survey Galaxy Zoo 2: Classify Google Mail - Inbox (11) JISCmail - Subscriber R... Inbox (2901) - Yahoo! Bloglines | My Feeds (287) Zoo Mergers: Merge

GALAXY ZOO MERGERS

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SIMULATIONS Viewed: 48 Selected: 2 Enhanced: 0 Evaluated: 0 Level: 0 Animate

Explore Enhance Evaluate

Selected Sims

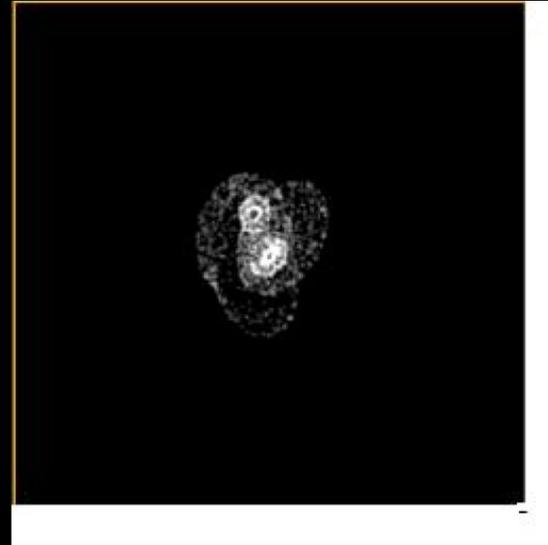
Reset View More Stars Fewer Stars Save Sim

M1 vs. R1 vs. R2
 Vx vs. Vy O1 vs. O1 Flip Gala
 Rz vs. Vz O2 vs. O2 Flip Gala

Explore
 Click on "More" to see 8 randomly generated simulations. Click on ones that you think show similarities to the image in the center. As you do this, the ones that you selected are saved on the right-hand side for later review. [help](#)

Enhance
 Maybe you found a simulation on the Explore tab that is similar to the image in the center, but you think it could be an even better match. Try your hand at adjusting the simulation input parameters to "design" a better simulation on the Enhance tab. Go to that tab and then select the simulation you want to improve. [help](#)

Evaluate
 Here is your opportunity to provide some additional feedback on the





Supernovae



UNIVERSITY OF OXFORD

CITIZEN SCIENCE ALLIANCE

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REF NEW SUB

Your Progress

Nice Start Moving Well Almost There You're Done!

Questions

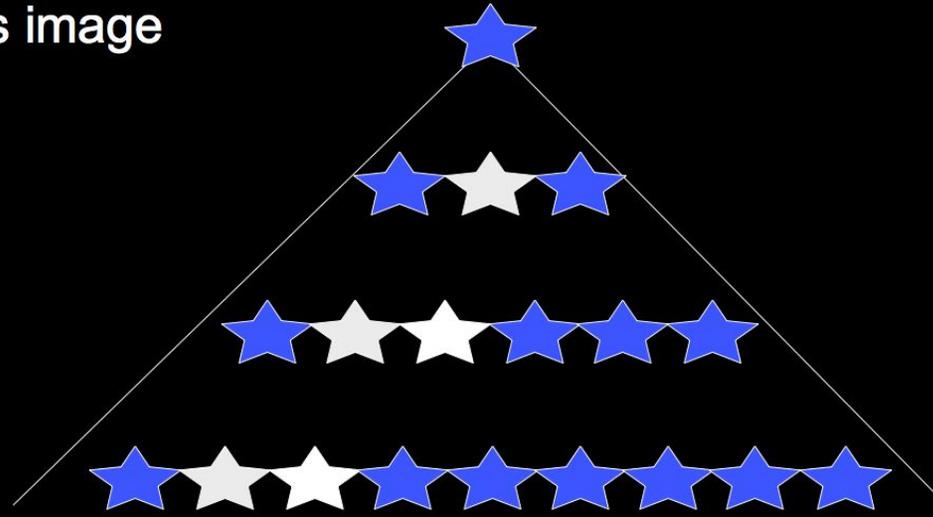
Answer the question below using the buttons provided.

Is the subtraction image generally clean? Is there a single obvious candidate?

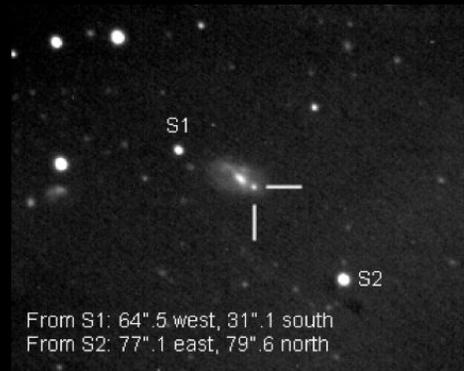
YES NO

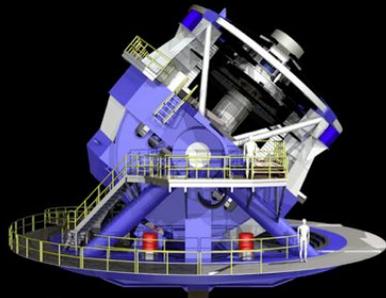
Need help?

Pipeline registers image



Call someone!





Maximize completeness

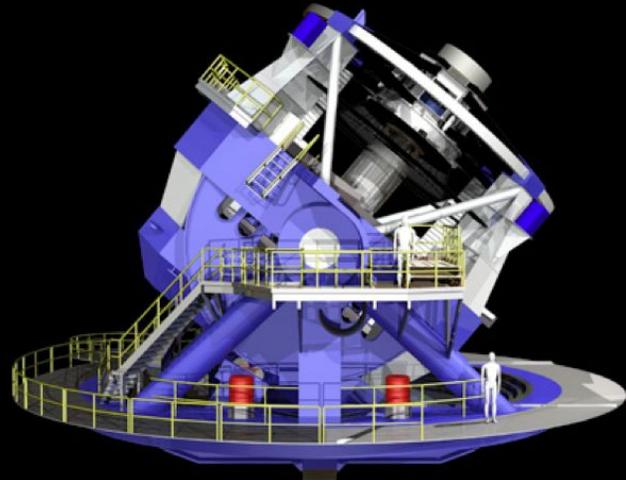
Improve training

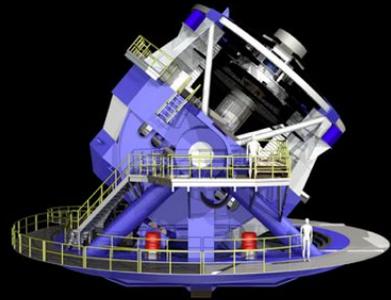


Minimize false positives









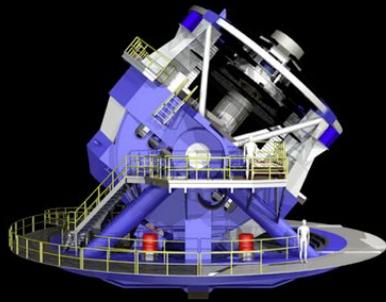
Maximize completeness

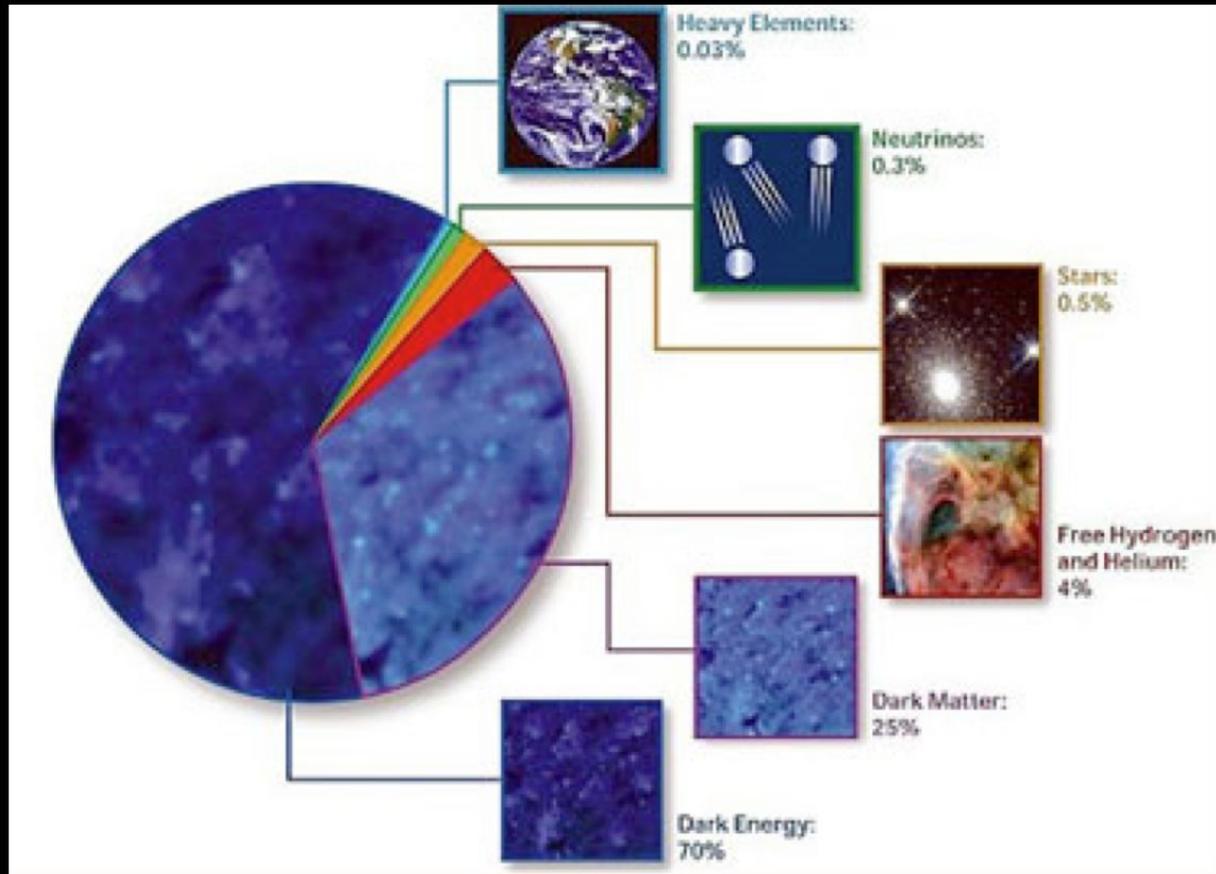
Improve training



Minimize false positives









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PLANETARIUM

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