

Galaxy Zoo²

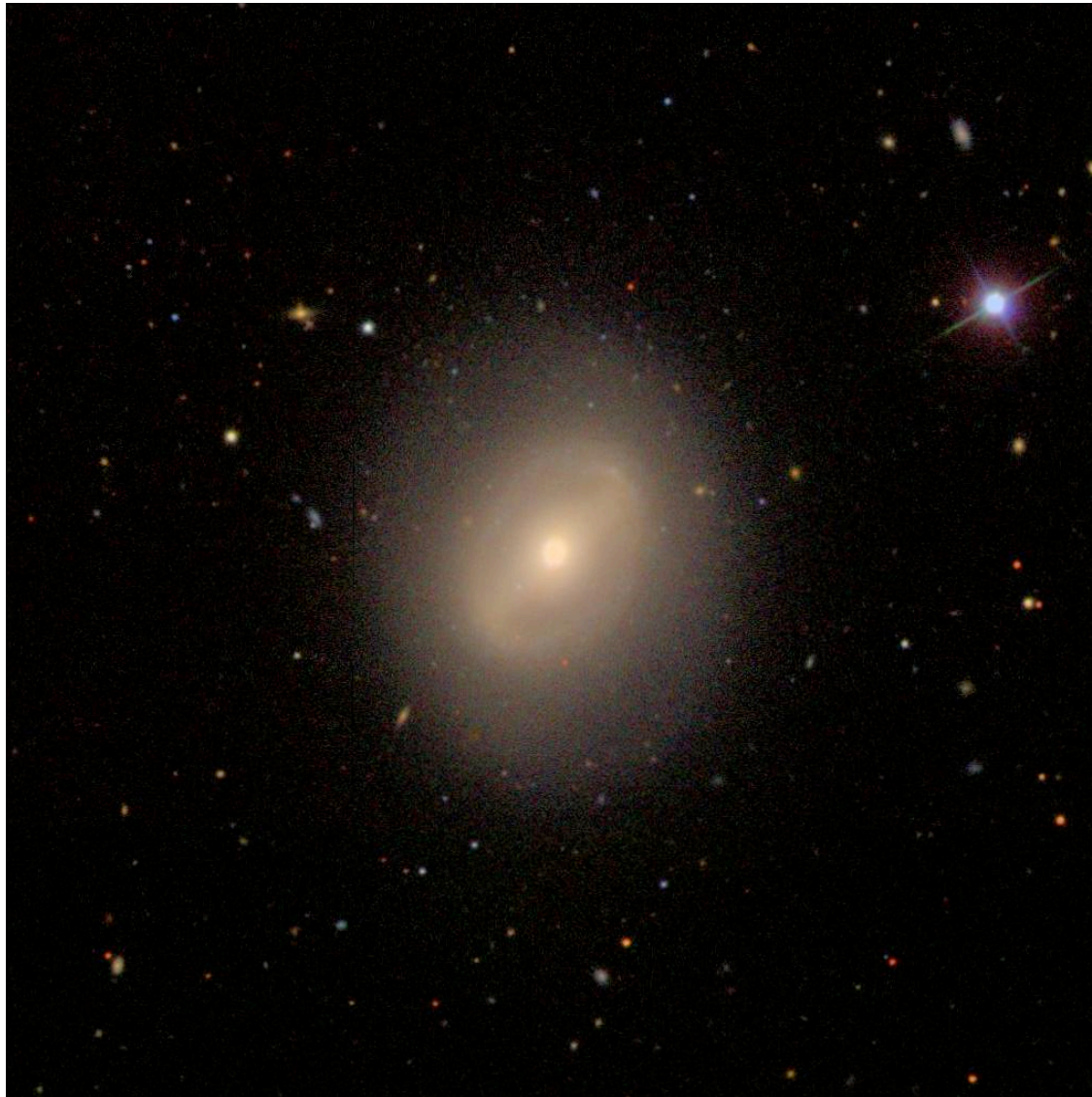
Kyle Willett
University of Minnesota

Galaxy Zoo 2: Zoo Harder

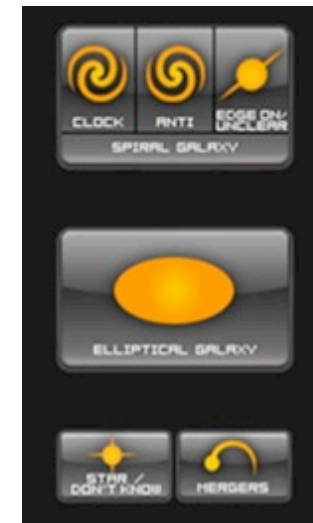
Kyle Willett
University of Minnesota

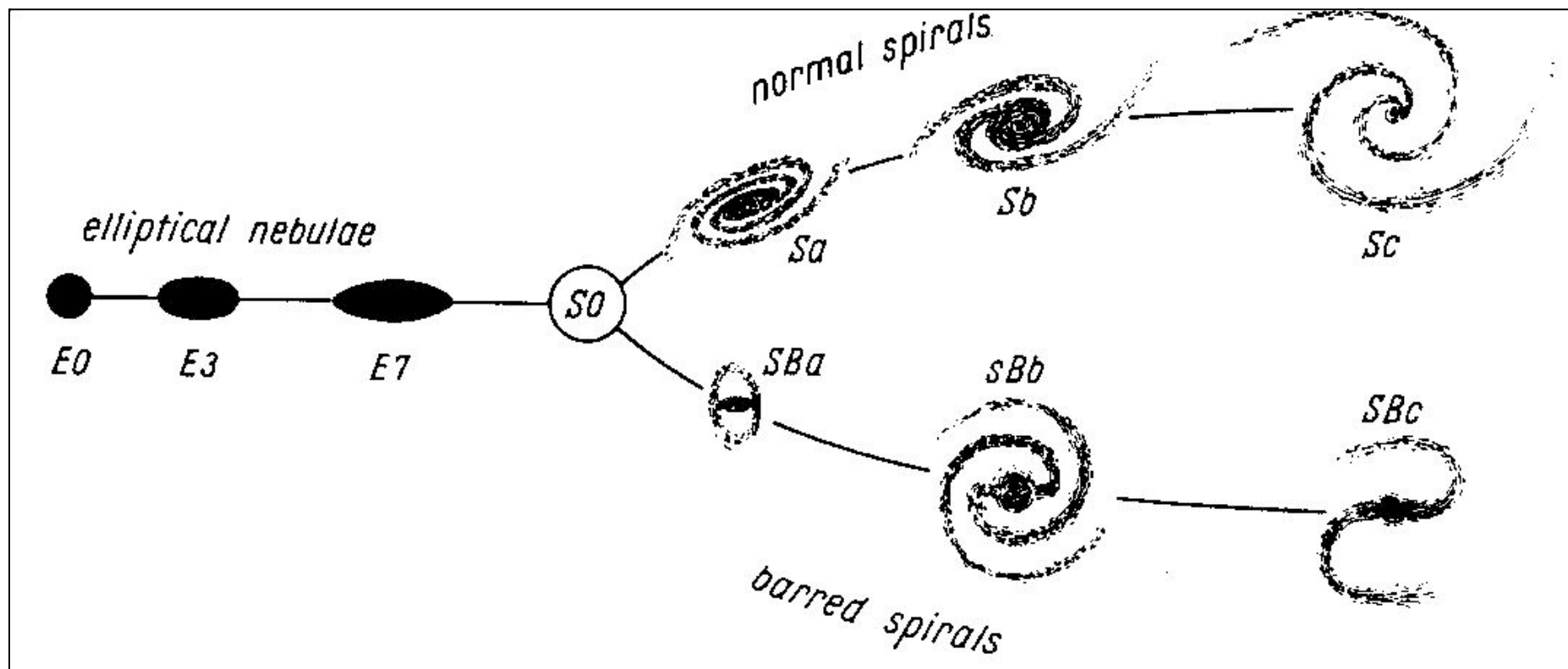
Galaxy Zoo 2: The Wrath of Chris

Kyle Willett
University of Minnesota

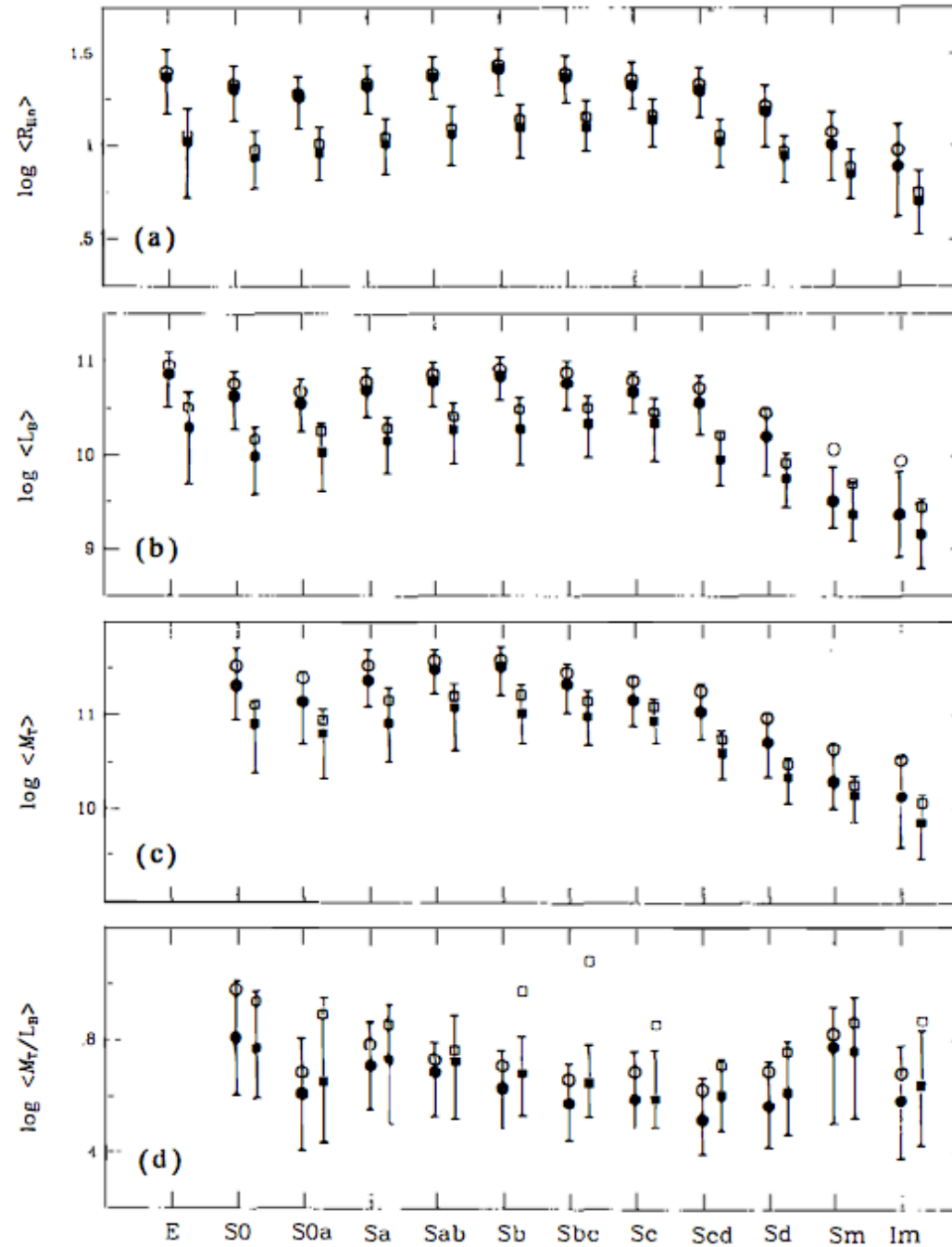


Galaxy Zoo (original recipe)





Hubble (1936)



size

luminosity

mass

M/L

Roberts & Haynes (1994)

The Hubble Tuning Fork

Ellipticals



E2

E6

Sa

Sb

Sc

Unbarred spirals

Lenticular
S0

SBa

SBb

Barred spirals

SBc

Galaxy Zoo 2 : Classify

SRCE BIJE ZA SLOVENIJO


zoo2.galaxyzoo.org/classify

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Galaxy Zoo is a ZOO NIVERSE project

GALAXY ZOO 2

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+ Invert galaxy image + Add to my favourites

Classify galaxies

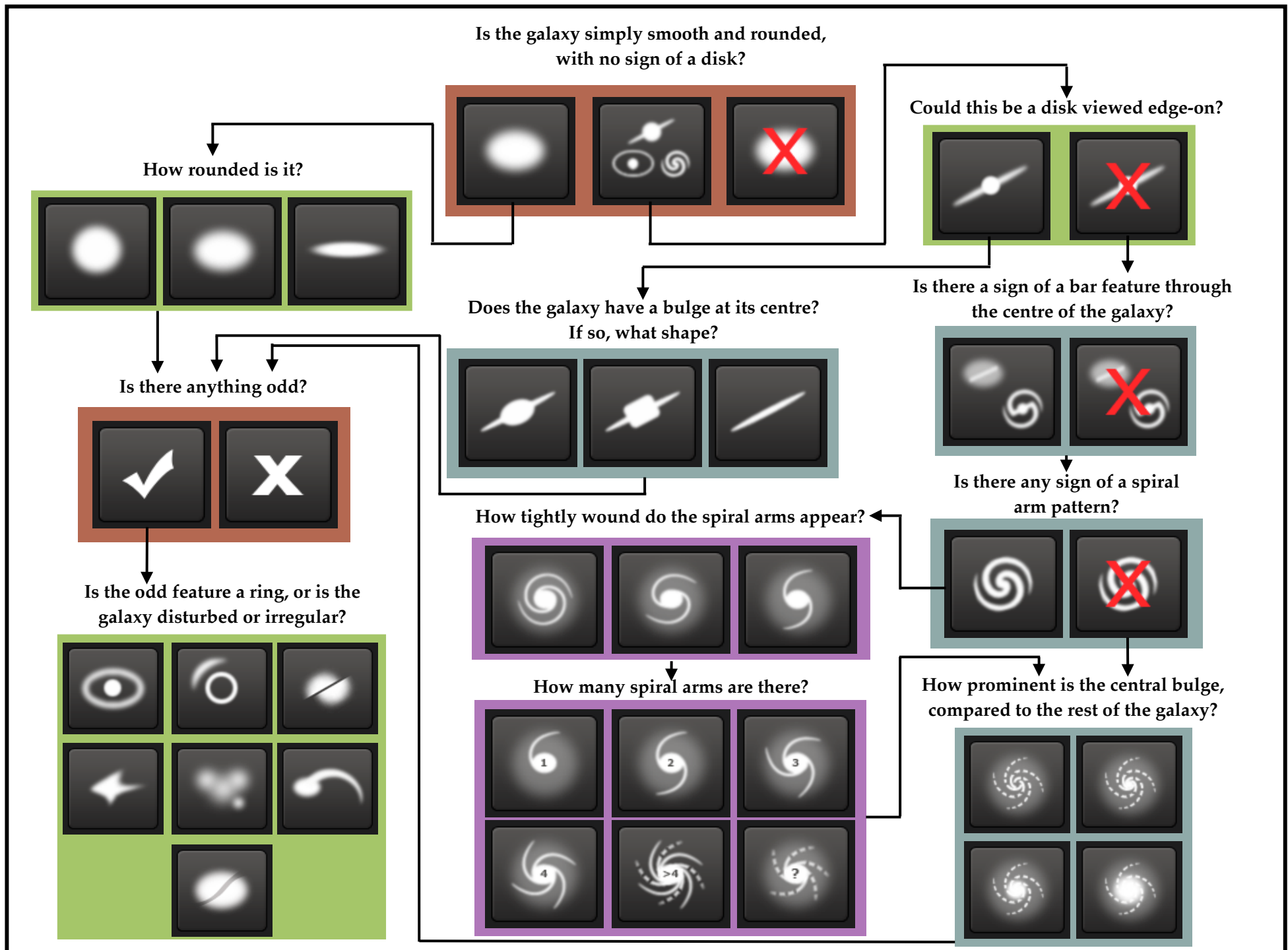
Answer the question below using the buttons provided.

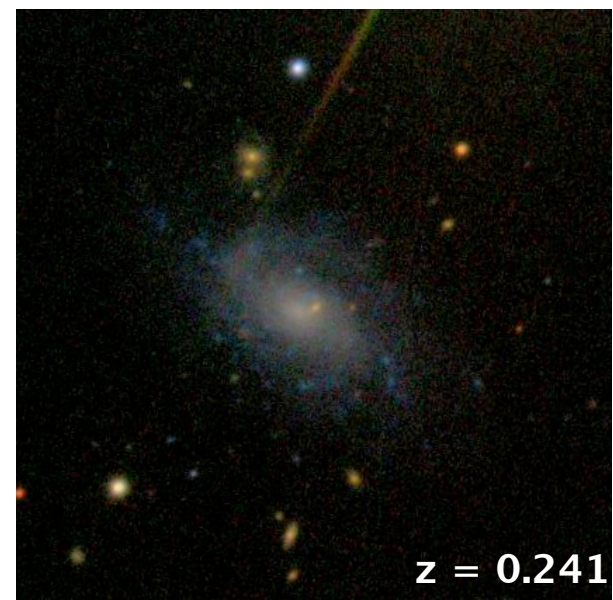
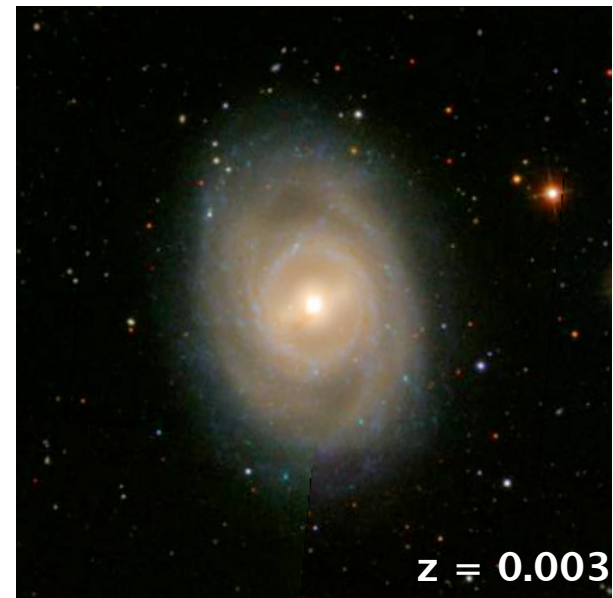
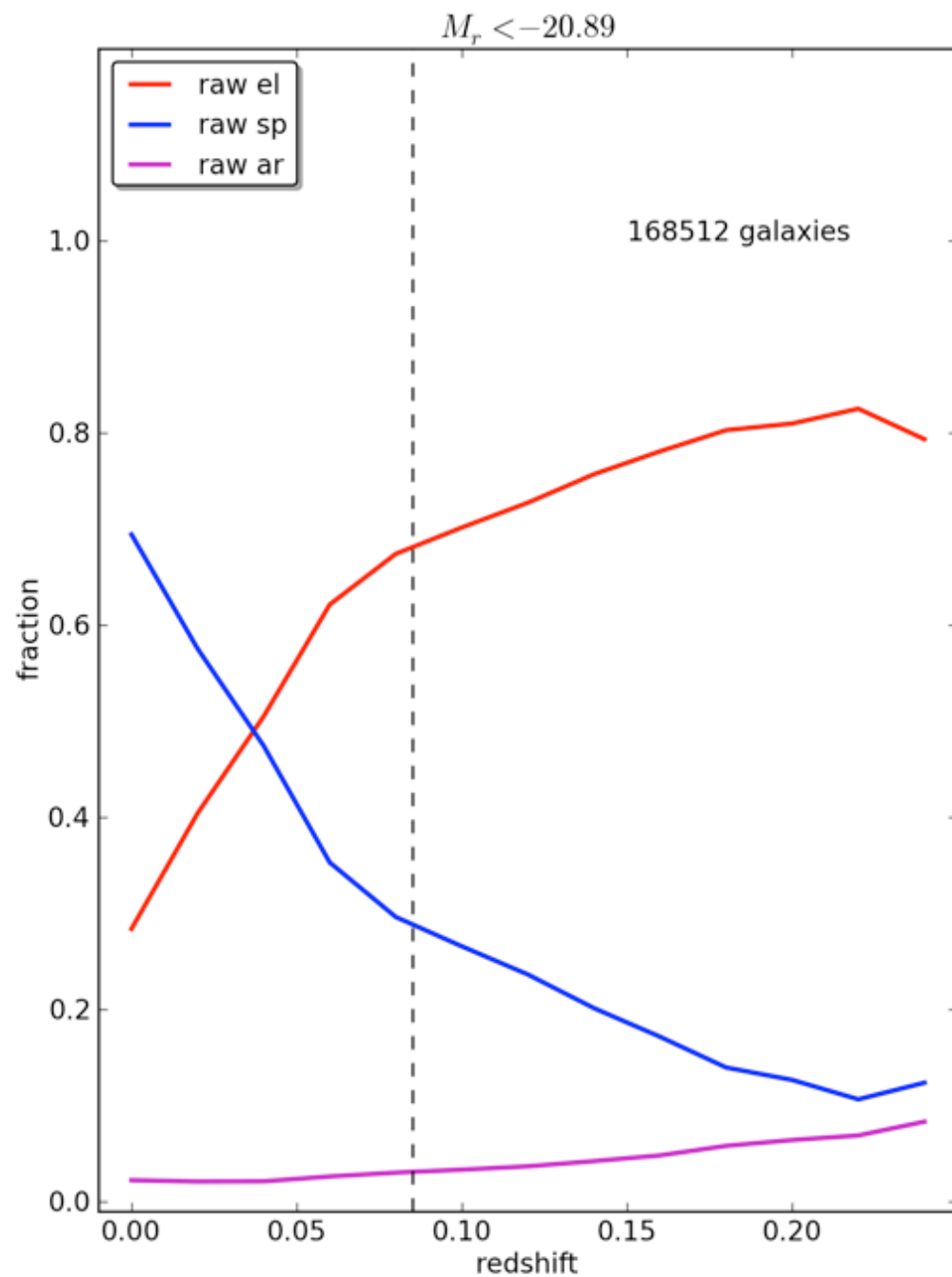
Is the galaxy simply smooth and rounded, with no sign of a disk?

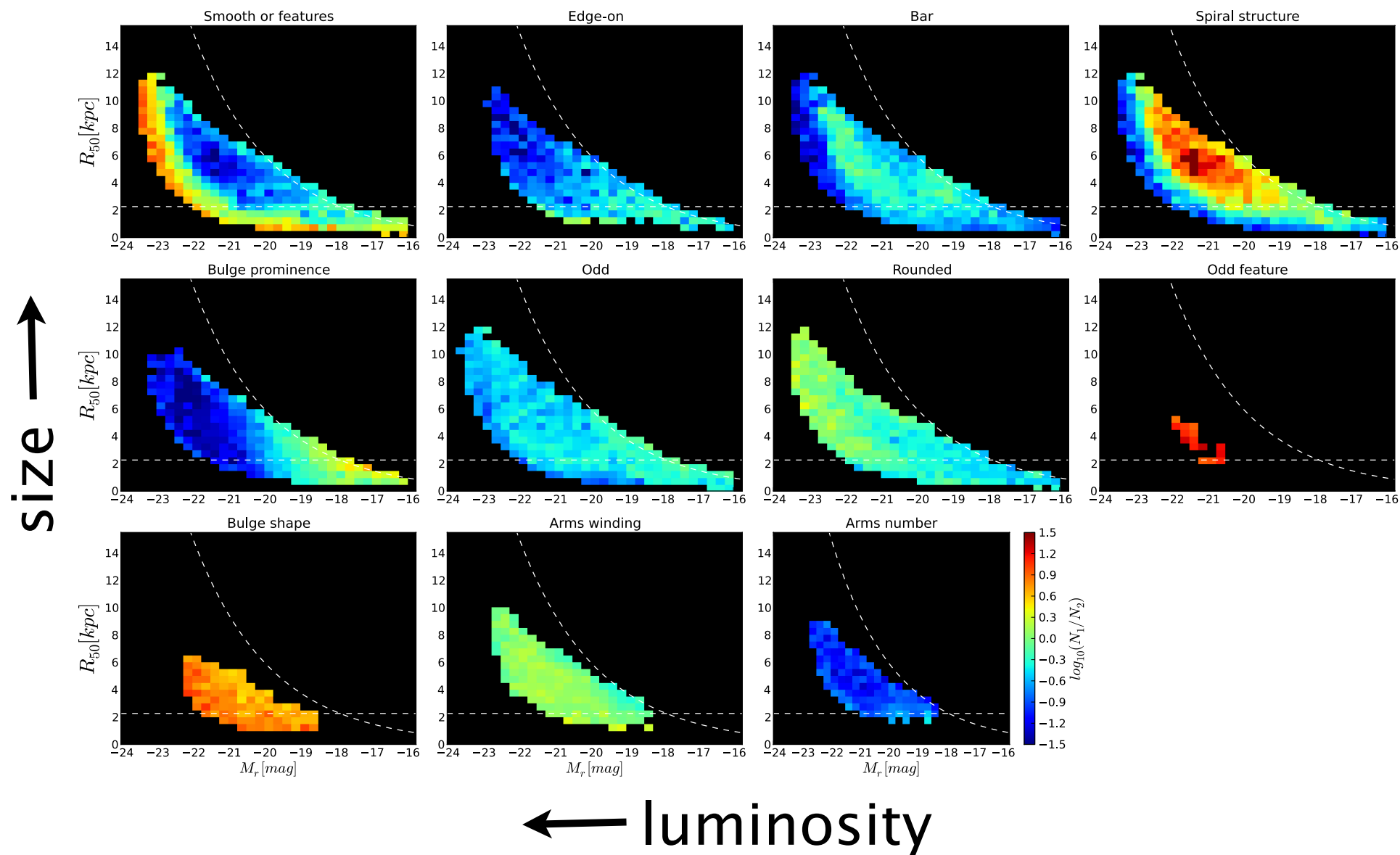


Smooth Features or disk Star or artifact

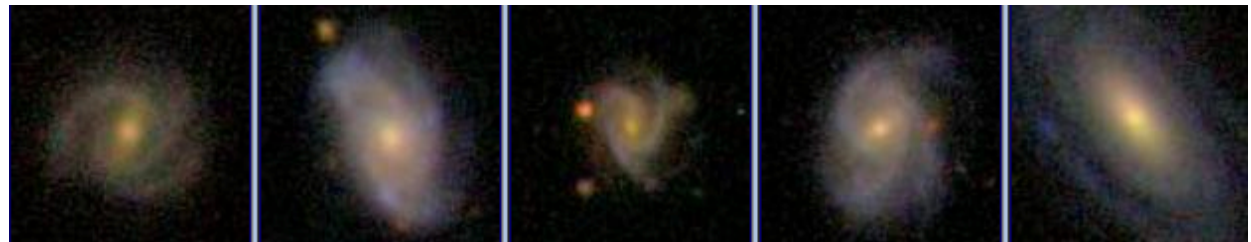
Need help? ?







Willett et al.
(2013)





“disturbed”



skyserver.sdss3.org/public/en/tools/explore/summary.aspx?id=0x112d14c220880060&spec=0x28e84d919a006800&apid=apogee.n.s.s3.4128.2M131...

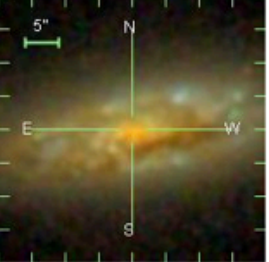
SDSS J131027.46+182617.4

Look up common name

Type		SDSS Object ID	
GALAXY		1237668296598749280	
RA, Dec		Galactic Coordinates (l, b)	
Decimal	Sexagesimal	l	b
197.61446, 18.43817	13:10:27.46, +18:26:17.40	330.66079	80.26964

Imaging WARNING: This object's photometry may be unreliable. See the photometric flags below.

Flags: DEBLENDE DEGENERATE PSF_FLUX_INTERP DEBLENDED_AT_EDGE BAD_MOVING_FIT BINNED1 INTERP COSMIC_RAY NODEBLEND CHILD BLENDED



Magnitudes				
u	g	r	i	z
16.52	14.95	14.00	13.32	13.14

Magnitude uncertainties				
err_u	err_g	err_r	err_i	err_z
0.01	0.00	0.00	0.02	0.00

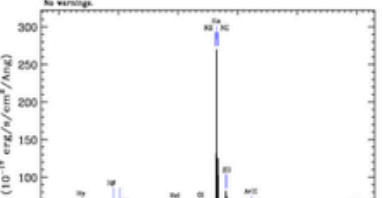
Image MJD	mode	Other observations	parentID	nChild	extinction_r	PetroRad_r (arcmin)
53500	PRIMARY	0	1237668296598749279	0	0.06	18.23 ± 2.152

photoZ (KD-tree method)		photoZ (RF method)		Galaxy Zoo 1 morphology
0.154 ± 0.0550		0.164 ± 0.1785		Uncertain

Cross-identifications [Show](#)

Optical Spectra SpecObjID= 2947691243863304192 [Interactive spectrum](#)

Survey: sdss Program: legacy Target: GALAXY_KEE GALAXY RA=197.61436, Dec=18.43818, Plate=DR10, Fiber=310, MJD=54508 410.51246±0.00001 Class=GALAXY STATUS=GOOD No warnings



Spectrograph		SDSS	
class	Redshift (z)	Redshift error	
GALAXY	0.012	0.00001	
Redshift flags			
OK			
plate	mjd	fiberid	
2618	54506	310	
survey	programname	primary	Other spec
sdss	legacy	1	0
sourcetype	Velocity dispersion (km/s)	veldisp_error	

SDSS DR10

skyserver.sdss3.org/public/en/tools/explore/ex_sql.aspx?cmd=select+*+from+zoo2MainSpecz+where+dr8objid=1237668296598749280&name=zoo2...

DR10 **zoo2MainSpecz**

Explore Home
Search
Imaging Summary
FITS
Finding chart
Other Observations
Neighbors
Galaxy Zoo
PhotoTag
Field
Frame
PhotoObj
PhotoZ
PhotoZRF
Cross-ID
Spec Summary
FITS
Plate
All Spectra
SpecObj
sppLines
galSpecLine
galSpecIndx
galSpecInfo
Fit Parameters
sppParams
StarformingPort
PassivePort
emissionLinesPort
PCAWiscBC03
PCAWiscM11
FSPSGranEarlyDust
FSPSGranEarlyNoDust
FSPSGranWideDust
FSPSGranWideNoDust
NED search
SIMBAD search
ADS search
Notes
Save in Notes
Show Notes
Print

specobjid	2947691243863304192
dr8objid	1237668296598749280
dr7objid	587742575373844511
ra	197.6143
dec	18.43819
rastring	13:10:27.44
decstring	+18:26:17.5
sample	extra
gal_classifications	45
total_votes	295
t01_smooth_or_features_a01_smooth_count	4
t01_smooth_or_features_a01_smooth_weight	4
t01_smooth_or_features_a01_smooth_fraction	0.089
t01_smooth_or_features_a01_smooth_weighted_fraction	0.089
t01_smooth_or_features_a01_smooth_debiased	0.118880525
t01_smooth_or_features_a01_smooth_flag	0
t01_smooth_or_features_a02_features_or_disk_count	40
t01_smooth_or_features_a02_features_or_disk_weight	40
t01_smooth_or_features_a02_features_or_disk_fraction	0.889
t01_smooth_or_features_a02_features_or_disk_weighted_fraction	0.889
t01_smooth_or_features_a02_features_or_disk_debiased	0.889
t01_smooth_or_features_a02_features_or_disk_flag	1
t01_smooth_or_features_a03_star_or_artifact_count	1
t01_smooth_or_features_a03_star_or_artifact_weight	1
t01_smooth_or_features_a03_star_or_artifact_fraction	0.022
t01_smooth_or_features_a03_star_or_artifact_weighted_fraction	0.022
t01_smooth_or_features_a03_star_or_artifact_debiased	0.022
t01_smooth_or_features_a03_star_or_artifact_flag	0
t02_edgemon_a04_yes_count	8
t02_edgemon_a04_yes_weight	8
t02_edgemon_a04_yes_fraction	0.2
t02_edgemon_a04_yes_weighted_fraction	0.2
t02_edgemon_a04_yes_debiased	0.12584205
t02_edgemon_a04_yes_flag	0
t02_edgemon_a05_no_count	32
t02_edgemon_a05_no_weight	32
t02_edgemon_a05_no_fraction	0.8
t02_edgemon_a05_no_weighted_fraction	0.8
t02_edgemon_a05_no_debiased	0.8635937
t02_edgemon_a05_no_flag	1
t03_bar_a06_bar_count	8
t03_bar_a06_bar_weight	8
t03_bar_a06_bar_fraction	0.25
t03_bar_a06_bar_weighted_fraction	0.25
t03_bar_a06_bar_debiased	0.25

SDSS DR10

The screenshot shows a web browser window with the URL data.galaxyzoo.org. The page features a dark blue header with the "GALAXY ZOO" logo in a yellow banner. Below the header, there is a navigation menu on the left and a main content area. The main content area is titled "Galaxy Zoo 1 data release" and contains a paragraph about the project's history and a section for the "Full catalog". Below the "Full catalog" section, there is a table titled "Table 2" that lists download links for the data in various formats.

Galaxy Zoo 1 data release

The original [Galaxy Zoo](#) project ran from July 2007 until February 2009. It was replaced by [Galaxy Zoo 2](#), [Galaxy Zoo: Hubble](#), and [Galaxy Zoo: CANDELS](#). In the original Galaxy Zoo project, volunteers classified images of [Sloan Digital Sky Survey](#) galaxies as belonging to one of six categories - elliptical, clockwise spiral, anticlockwise spiral, edge-on, star/don't know, or merger.

Full catalog

This webpage allows anyone to download the resulting GZ classifications of nearly 900,000 galaxies in the project.

Galaxy Zoo is described in [Lintott et al. 2008, MNRAS, 389, 1179](#) and the data release is described in [Lintott et al. 2011, 410, 166](#). Anyone making use of the data should cite at least one of these papers in any resulting publications.

Table 2	
This table gives classifications of galaxies which have spectra included in SDSS Data Release 7. The fraction of the vote in each of the six categories is given, along with debiased votes in elliptical and spiral categories and flags identifying systems as classified as spiral, elliptical or uncertain.	
CSV (gzipped)	http://galaxy-zoo-1.s3.amazonaws.com/GalaxyZoo1_DR_table2.csv.gz
CSV (zip)	http://galaxy-zoo-1.s3.amazonaws.com/GalaxyZoo1_DR_table2.csv.zip
FITS	http://galaxy-zoo-1.s3.amazonaws.com/GalaxyZoo1_DR_table2.fits
VOTable	http://galaxy-zoo-1.s3.amazonaws.com/GalaxyZoo1_DR_table2.vot.gz

Note: the provided #am in Table 2 are there for the convenience of users who do not want to get into the

<http://data.galaxyzoo.org>

Automated

698,420

Citizen science

304,122

Experts

Galaxy Zoo 2

2,253

4,458

14,034

What else is in
Galaxy Zoo 2?

[willett/galaxyzo](#) x
 [Classification & St](#) x
 [Galaxy Zoo 2 : Cl](#) x
 [Home | Galaxy Zo](#) x
 [Galaxy Zoo Scienc](#) x
 [ICG Galaxy Zoo: Barre](#) x

[www.icg.port.ac.uk/~hoyleb/bars/](#)

[Google](#)
[Comics](#)
[NED](#)
[SIMBAD](#)
[APOD](#)
[ADS](#)
[CC](#)
[UMN](#)
[VC](#)
[GZ](#)
[Weather](#)
[Guardian](#)
[Other Bookmarks](#)

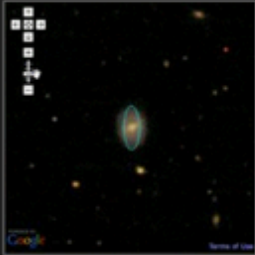
Question 1: Does the ellipse describe the shape of the galaxy well?

You may need to adjust the zoom level on the map to see the galaxy. [Visit the tutorial](#) [opens a new window]

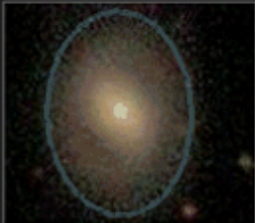
Hello benhoyle
Logout

Example

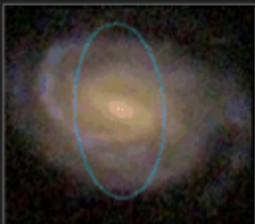
Adjust Zoom

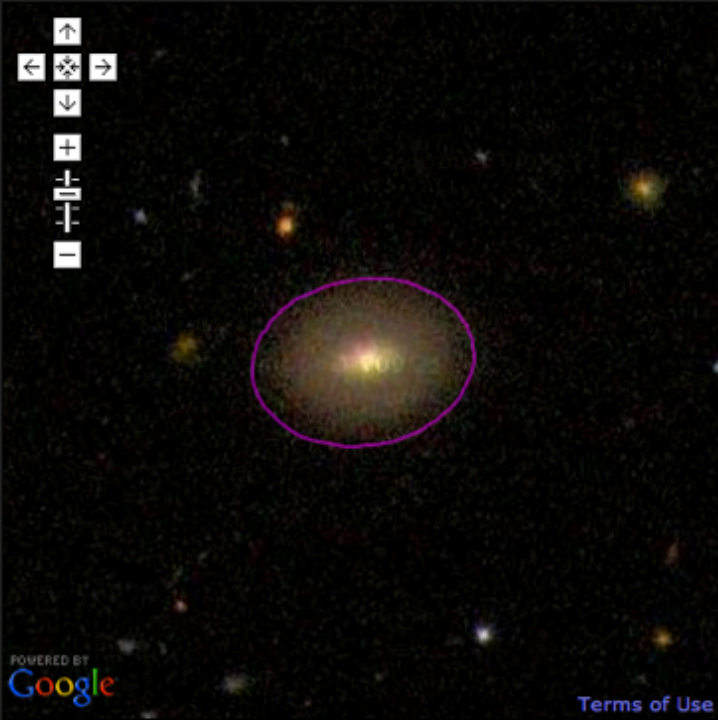


Yes:



No:





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SHOW GALAXY

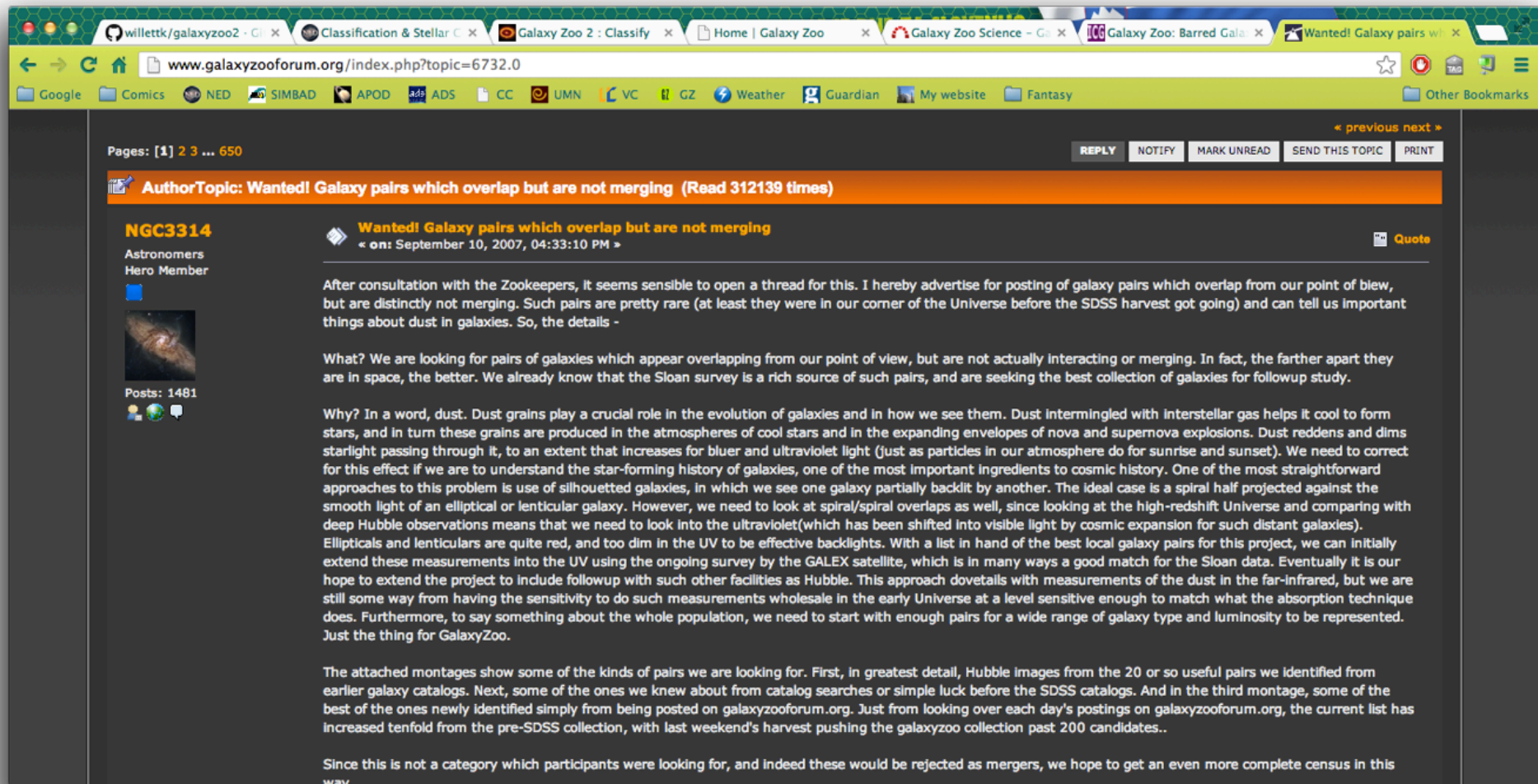
Response

YES NO

Comments

Please record anything unusual.

Hoyle et al. (2011)



Keel et al. (2012)

Galaxy Zoo 2



Classification
catalog

Willett et al. (2013); DR10
and [http://
data.galaxyzoo.org](http://data.galaxyzoo.org)



Bar sizes and
lengths

Hoyle et al. (2011); [http://
data.galaxyzoo.org](http://data.galaxyzoo.org)



Serendipitous
discoveries

Keel et al. (2013); [http://
talk.galaxyzoo.org](http://talk.galaxyzoo.org)



Galaxy Wars

Galaxy Zoo



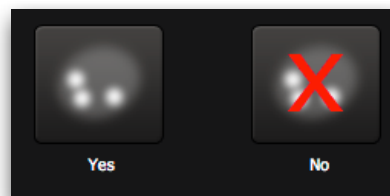
~900,000 galaxies from SDSS
 Lintott et al. (2011)
 30+ publications

Galaxy Zoo 2



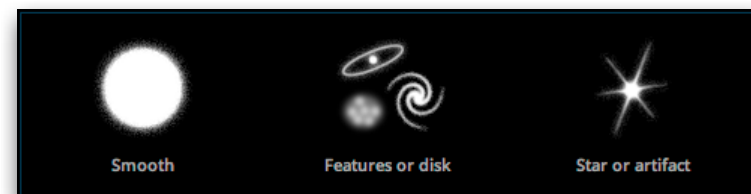
~300,000 galaxies from SDSS
Willett et al. (2013)
 9+ publications

Galaxy Zoo: Hubble



~100,000 ACS images from COSMOS
 ~50,000 SDSS images
 analyzing and reducing data

Galaxy Zoo



~50,000 images from CANDELS
 ~230,000 images from SDSS DR8
 still collecting classifications



Thanks!

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@kwwillett