Galaxy Zoo Lens Search

Lessons from a non-optimised search
GZ History

Got (marginally) easier

Now have
439 pages of entries,
6574 replies,
Viewed 207464 times!!

Galaxy Zoo: Hubble Gravitational Lenses

Thanks for all your efforts in identifying possible gravitational lenses — with the new release of the Zoo, we have an even harder challenge for you. The galaxies you will be looking at come from a region observed by the Hubble Space Telescope in April 2005. These objects were selected based on visual inspection by astronomers and robot scanning. The automated process is called GRAPHS, and you can help us identify gravitational lenses in these images. Whenever you find a galaxy that has a lensed image, you are helping to advance our understanding of the universe.

For those of you who haven’t seen it already, there’s a nice guide to lensing for the SDSS Zoo made by Emily: “Zoo Guide to Strong Gravitational Lenses.”

Happy hunting!

Aprajita & Phil
Great first post from pluk

pluk
   Hero Member
   Posts: 6759
   serving coffee on aircraft causes turbulence

Re: Possible strong gravitational lenses
   Reply #1 on: September 14, 2007, 08:39:13 AM

Okay, I'll start: (posted it on the Oddballs thread earlier, but I shall remove it there then)

Ref: 587732589572325457

Note the faint ring of blue beads along the bottom-right edge of the elliptical in the center.
Another one by Els
Another early one by Fluffy

Re: Possible strong gravitational lenses
« Reply #28 on: September 16, 2007, 04:02:43 PM »

wasn’t my target, but saw it off to one side

588017605222793376
Lens Hunters Teach Themselves & Become Experts

-- Script 1: Generate candidates which include the "9 o'clock arc" **
-- Return an id/ra/dec image list for RED galaxies for the given "ra" range
-- Any rings will probably be up toward the top of the list
-- The "ra" range includes the "9 o'clock arc"
-- The image can be seen on page 1, row 2, column 2 after successful pasting the query results into the image list tool

SELECT p.objID,p.ra,p.dec
FROM PhotoObj p
WHERE (p.primTarget & 0x000000000000000000)=0 AND (p.primTarget & 0x000000000000000000)=0 AND (p.primFlag > 0) AND p.ra between 5.5 and 5.9 -- "ra" range order by p.petrorad_r desc -- Larger radius clusters to top of list
-- ** End of script **
Thanks Christine!!
Curiosities & False Positives

SF Rings

This one, posted in ring galaxies, looks very like the horseshoe?
58778905563341162

Arcs or an Arms?

Weird Alignments

Blue Bananas
Curiosities & False Positives

**dlocksmith**
Hero Member

Re: Possible strong gravitational lenses
« Reply #55 on: September 19, 2007, 08:08:41 PM »

Some days everything looks like a lens 😊

587724199358300431
Not sure what to make of this one; very unusual

Known Lenses
First Doubles & Quads

Looks promising!
HST imaging follow-up (thanks Phil!) revealed the sources are not gravitationally lensed.

Utility of high-resolution imaging in lens identification and confirmation demonstrated.

Extended galaxies arranged in a cross

One of the double is a spiral galaxy

Two point sources this time but no hint of a ring and mass of lens too small to produce such large separation.
Niche of the GZ search
Wide separation, group/cluster lenses
We need to do better...

More flexibility & dedicated tools required
Quality of the Images

SDSS image quality makes finding lens candidates hard

Easier for LensHunters to find plausible lensing signatures with better quality & more sensitive data such as in Hubble Zoo
Learn from other projects, e.g. planet hunters talk

Learn from lens hunter experience

Learn from scientist interaction
Learning from GZ

• Learnt that we need a dedicated Lens Tool & interface that’s adapted to specific lens searches
• GZ searches were not specific or organised enough for us to maximise the Citizen Scientists and answer science questions
• Forum is difficult to navigate and search, we need much better organisation, more interaction with the users, instant feedback…
• Learn a lot from the GZ experience to feed into the future…
Feedback from LensHunters

• What would help you find more lenses?
• What do you think would help new users become skilled lens finders?
• What did you find difficult when you were a novice lens hunter?
• What do you like best about lens hunting? What makes it fun?
• What features would you like to see on a custom-built website for gravitational lens identification?
What would help you find more lenses?

- More time
- Robotic search first sounds better than serendipitous search as in GZ ("crusing" inefficient)
- Colours
  - at least 3 filters like SDSS. 2 colour Hubble images difficult
  - Ability post different combinations of filters
  - Navigation – look around the neighbourhood
- Meta-data
  - Access to NED, & multi-wavelength data
  - Spectra where available
  - Photo-z’s
- Recognition demotivating
  - Independent discoveries by professional astronomers frustrating and not rewarding
What do you think would help new users become skilled lens finders?

- **Lots & Lots of Examples**
  - Posting a gallery of confirmed lenses
  - False positives/training set with feedback on whether the ID is right or not, if not tell them what it is
- **Explanation of what is a lens and how to find them**
  - Why arcs aren't typically thick
  - Separation of images from lenses
- **Assurance of # classifications**
  - How many people have looked at it, if classified sufficiently remove from Dbase (option to view inactive list)
- **Discussion forum**
  - Learn from each others discoveries, mistakes
  - FEEDBACK from scientists
- **Interesting facts (make search more interesting)**
- **Easier means of flagging lenses**
- **Grading lens candidates (Peas Hunt or SN Zoo)**
- **Thanks & positive feedback & recognition**
What did you find difficult when you were a novice lens hunter?

- Identifying Lenses
  - Lensing vs. rings
  - Arcs vs. faint spiral arms
  - Arc/image separation
  - Thickness of potential arcs/images
  - Difficult to extract information unless published already (NED/ADS)
- Not enough examples available (lenses & false positives)
- Better data, SDSS not optimised for these challenging searches
- Not enough feedback
- Forum thread difficult to search
What do you like best about lens hunting? What makes it fun?

• Gravitational Lensing is fascinating
• Hunt is the thrill
• Searching out to higher distances, redshift, bending of space
• Motivation was “real contribution”
  • Discovery that computer searches have missed
  • Number of false positives/untrue lenses demotivating
  • Computer/Robot searches demotivating
• Motivation is recognition
  • Currently lacking
What features would you like to see on a custom-built website for gravitational lens identification?

- **Image Manipulation & Display**
  - SDSS like interface (explore)
    - Zoom in & out
    - Invert image
    - Navigate
  - Contrast control
  - Meta-data
  - Tool to measure the lens/image separation
    - Ability to store measurements of multiple images/arcs
  - Multi-wavelength fits viewer
    - Post/record different colour combinations?

- **Image size**
  - Same or scaled?

- **Buttons for**
  - arcs vs qso’s
  - Colours
  - Detail(s) in the arc

- **See an arc but is likely**
  - Neighbouring galaxy
  - Spiral arm
  - Star-forming ring
  - Tidal feature
  - In-situ SF

- **Talk:**
  - Who’s online
  - Rate comments to promote comment visibility (rises to top)

- **Examples:**
  - true lenses
  - false positives
  - Don’t miss non-standard/complex lens images
Engaging Users

- **User demographics**
  - Casual
  - Interested
  - Expert

- **Motivation**
  - New discoveries
  - Recognition
  - Helping scientists
  - Making a difference
  - Beating robots
  - Exotic lenses

Need to make the new Zoo engaging, interactive & fun for all types of users
Flexible enough for different surveys
Interaction & feedback