PHY-765 SS19: Gravitational Lensing. Worksheet Week 8

1 Journal Club #2: Paper selection

Select a paper for the second installment of our journal club (see Week 6 exercise 1 for details).

1.1

Use astro-ph's search engine to get a list of papers posted or updated in the month of May 2019 with "lensing" in the abstract. Select the paper you find most interesting based on title or abstract and send it's URL in an email to kbschmidt@aip.de.

1.2

Read your selected pick and prepare a ∼3 minute overview of the paper (no slides). Obviously 3 minutes is not enough time to get into the glory details of the paper, so the overview should just answer the following questions:

- What is the title and who are the main authors of the paper?
- What is the aim of the work?
- What are the main conclusions of the work? Here you can show the main plot of the paper, if you think this is useful for clarification and getting the point across.
- What is your overall impression of the work? That is, do you see anything that could be improved? Is there (a lack of) clarity about the procedures used? What are the importance of the results seen in the broader picture? etc.

Hence, the overview is a 'teaser' (with spoilers) of the paper, making everyone aware of its existence, in case people want to follow up on it.

The paper overview will be given in class next week

2 Comparing lens search examples with week 1 collections

Consider your reply to the task 3.1 from Week 1.

2.1

Are these collections part of or related to the examples described in this week's slides?

2.2

Which surveys do these lenses stem from? Are these larger/smaller than the SDSS/DES/Gaia surveys introduced in this week's slides?

3 Exploring the core radius size's dependence on multiple images in the CIS

Using the lens equation for the CIS

$$\theta(\beta - \theta) = -\theta_0 \left[\sqrt{\theta^2 + \theta_{\rm core}^2} - \theta_{\rm core}\right]$$

plot β as a function of θ (both in units of θ_0) for a core radius of size $\theta_{\rm core} = 0.1\theta_0$, $0.25\theta_0$ and $0.5\theta_0$. Flip the axes and determine the location where two new images appear for such lenses.