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# Title

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## ABSTRACT

**Key words:** gravitational lensing – galaxies: structure

## 1 INTRODUCTION

## 2 DATA

The dataset analised was released as part of the third Sloan Digital Sky Survey (SDSS-III) and consists of publicly available data. A sample of 21 lensed Lyman-alpha emitting galaxies were discovered between November 2015 and December 2016 during the BOSS survey. Their redshifts span from 2 to 3 while the lensing objects are massive galaxies, mostly elliptical galaxies, at redshift around 0.55. Optical data as the considered sample, can allow us to detect substructures with mass in the range $10^7 - 10^8 M_\odot$ given their resolution; lower mass substructures can be detected using interferometric data that can take advantage of a higher resolution. The nature of the lensed galaxies is carefully selected to increase our sensitivity to the presence of substructures. Lyman-alpha emitters (LAEs) consist of inhomogeneous distribution of star forming knots and are often composed by distinct (components) units merging into one object. Given their structure, they present an extremely lumpy and discontinuous brightness profile which we can exploit to enhance the capability of identifying a substructure, as follows. Provided that the latter is located in the lens galaxy main halo and in correspondence of the Einstein ring, its presence would lead to a distortion in the brightness distribution of the lensed images. This local brightness perturbation will be more evident the more lumpy is the original unperturbed brightness profile in the same way changes in the positions of bricks in a wall are more easily identified if neighbouring bricks are differently coloured.

## 3 LENS MODELLING

The lens modelling of each system was performed using the Bayesian pixelated technique developed by Vegetti & Koopmans (2009) (see also Vegetti et al. 2014). The mass density distribution of the lens is parametrised with an elliptical power-law profile (plus external shear) with a total of eight free parameters. The surface brightness distribution of the lens is parametrised using elliptical Sersic profiles and it is simultaneously modelled with the lens mass distribution. The surface brightness distribution on the unlensed background source is instead reconstructed using an adaptive Delaunay tessellation.

## 4 RESULTS

## 5 DISCUSSION

## REFERENCES

Vegetti S., Koopmans L. V. E., 2009, MNRAS, 392, 945
Vegetti S., Koopmans L. V. E., Auger M. W., Treu T., Bolton A. S., 2014, MNRAS, 442, 2017

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**Table 1.** Add caption here.

| Name (SDSS) | $z_{lens}$ | $z_{src}$ | $R_{ein}$ |
|---|---|---|---|

**Table 2.** Add caption here. This table should contain the best parameters for the sersic models

| Name (SDSS) | $n_{Ser}$ |
|---|---|