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GALAXY SCALE LENSES IN THE RCS2

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We present the first catalog of galaxy scale lensing systems in the RCS2. The 60 candidate systems in this catalog are composed by massive Luminous Red Galaxy (LRG) lenses surrounded by bright strongly distorted arcs and/or multiple images of background blue galaxies.

The second Red Cluster Sequence Survey (RCS2; Yee et al. 2007) is a ∼1000 square degrees survey, designed to search galaxy clusters to $z \sim 1$. The survey area is divided into 13 low extinction patches on the sky which have been observed in the g', r' and z' filters of the square-imager MegaCam at the CFHT. Automatic photometry of these observations have yielded a catalog which includes ∼90 million galaxies.

Since gravitational lensing strongly depends on the mass of the foreground object, we pre-selected from the ∼90 million galaxies, those most massive: the LRGs. To accomplish this, we took advantage of the common areas between RCS2 and SDSS and selected ∼60,000 RCS2 galaxies with similar loci on the color magnitude diagram to that of the spectroscopically confirmed SDSS LRGs with RCS2 photometry.

We performed an automatic search for blue neighbors within 6″ of the candidate LRGs. The resulting ∼12,000 LRGs (with blue neighbors) were visually inspected to assess the nature of their neighboring objects, yielding our final catalog.

Due to the selection method and nature of the survey, our lens catalog has unique properties, including:

- LRG lenses: the lensing galaxies are bright and reach high redshifts (see Figure 1b).
- High-z sources: high lens redshifts plus the photometric selection of the arcs, does not constrain the redshift of the sources to low redshift.
- No bias: The LRG lenses have been blindly selected over large areas.
- Bright arcs: candidates were selected from optical ground based imaging (4 mts. telescope).
- Environment: the candidates were selected from RCS2 fields, so extensive photometric information on their surroundings is available.

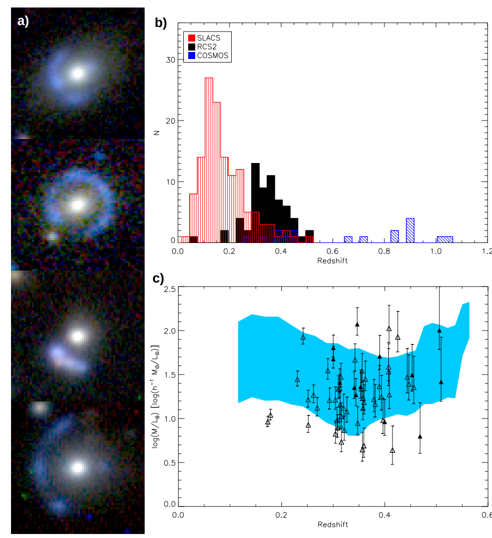

Fig. 1. (a) 4/60 of the best candidates from the sample. (b) Redshift distribution of the sample compared to SLACS (Bolton et al. 2008) and COSMOS (Faure et al. 2008). (c) Preliminary mass-to-light ratio evolution assuming source redsfhits $0.6 < z < 3.0$ (triangles), compared to simulated galaxies (cyan region).

Gravitational lensing gives an un-biased measure of the total lensing mass enclosed within the Einstein radius. Coupling these measured masses for our LRG lenses with the photometric information available in the RCS2 galaxy catalog, a measure of their mass-to-light ratios was obtained (see Figure 1c). Given the redshift spread of the lenses in our catalog, this gives us an estimate of the mass-to-light ratio evolution of LRGs. Even when these are very preliminary results, comparison with simulated galaxies (Lagos et al. 2008), shows an agreement. Further spectroscopic and high resolution imaging observations of these systems will allow more accurate lens models and, thus, a more accurate measure of the mass-to-light ratio evolution.

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