Dynamical Analysis of Lens Group SL2S J02140-0535: Preliminary Results

K. Rojas (1), V. Motta (1), R. Muñoz (2), G. Foëx (1), T. Verdugo (3), M. limousin (4,5), J. G. Fernández-Trincado (6)

(1) Instituto de Física y Astronomía, Facultad de Ciencias, Universidad de Valparaíso.
(2) Instituto de Astrofísica, Pontificia Universidad Católica de Chile, Santiago, Chile.
(3) Centro de Investigaciones de Astronomía, CIDA, Venezuela.
(4) Aix Marseille Université, CNRS, LAM.
(5) Dark Cosmology Centre, Niels Bohr Institute, University of Copenhagen.
(6)Institute Utinam, CNRS UMR6213, Université de Franche-Comté, OSU THETA de Franche-Comté-Bourgogne, Besançon, France.

ABSTRACT

The Strong Lensing Legacy Survey (SL2S) has selected a sample of strong lensing systems in the Canada-France-Hawaii Telescope Legacy Survey (CFHTLS) searching for extended features (arcs) around elliptical galaxies. Spectroscopic follow-up of lensing galaxy groups has been done with VLT/FORS2. Preliminary results for SL2SJ02140-0535 (SA22) are presented. New spectroscopic data are used to determine membership and the velocity dispersion.

karina.rojas@uv.cl

INTRODUCTION

The Strong Lensing Legacy Survey (SL2S, Cabanac et al. 2007) search for strong-lensing systems on CFHT Legacy Survey fields. This survey has allowed us to find and study a large sample of group-scale lenses (More et al.2012), as well as galaxy-scale gravitational lenses (Gavazzi et al. 2012). Some galaxy groups discovered in the SL2S have been studied in detail using differents techniques (Limousin et al. (2009); Verdugo et al. (2011)).

More et al. (2012) showed the first compilation of lens candidates (SARCS sample), consisting of 127 objects, with 54 systems labeled as promising lenses. The main goals of SL2S is to accurately determine the characteristics of the lensing groups through various methods, for example with dynamical analisys (Muñoz et al. 2013), weak lensing analysis and luminosity density maps (Foëx et al. (2011, 2014); Verdugo et al. (2011, 2014)).

Figure 1: Four examples of the SARCS sample. Taken from More et al. (2012)

In this work we analyze the lens group SL2S J02140-0535 (Figure 2).

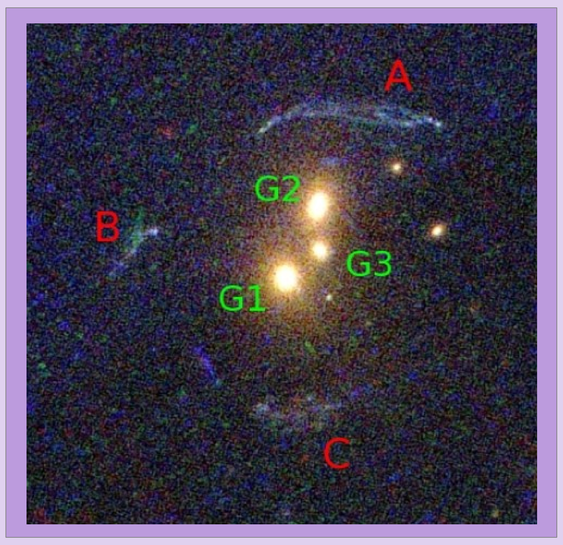

Figure 2: The lens group SL2S J02140-0535, composite HST/ACS F814, F606, F475 color image taken from Verdugo et al. (2013).

Observation and Data Reduction

Here we present preliminary results of the new spectroscopic data for the lens group SL2S J02140-0535 obtained with FORS2/VLT in 2012 year. A medium resolution grism (GRISM 300I) was used to obtain two images with an exposure time of 1300 seconds each. The targets for the MOS masks were selected based on the magnitude and color of the galaxies ($i < 22.0$, and $(g - i)_{lens} - 0.15 < g - i < (g - i)_{lens} + 0.15$).

The MOS masks were reduced using the ESO Recipe Execution Tool (EsoRex), the Common Pipeline Library (CPL), and the Optimal Spectrum Extraction Package (OSEP) in IDL.

Method

The spectroscopic redshift of each target is estimated using Radial Velocity SAO package in IRAF software.

The group members and the velocity dispersion is obtained using the biweight estimator (Beers et al. 1990). This procedure is described in detail in Muñoz et al. (2013).

Results

Using spectroscopic data taken in 2008, Muñoz et al. (2013) found 16 group members, a line-of-sight velocity dispersion of 364^{+60}_{-137} km/s, and a virial mass of $1.14^{+-5} \times 10^{14}$ $M_{\odot}$.

A joint analysis of the 2008 and 2012 spectroscopic data yield: 24 group members and a line-of-sight velocity dispersion of 324 ± 91.78 km/s. This is in good agreement with previous results.

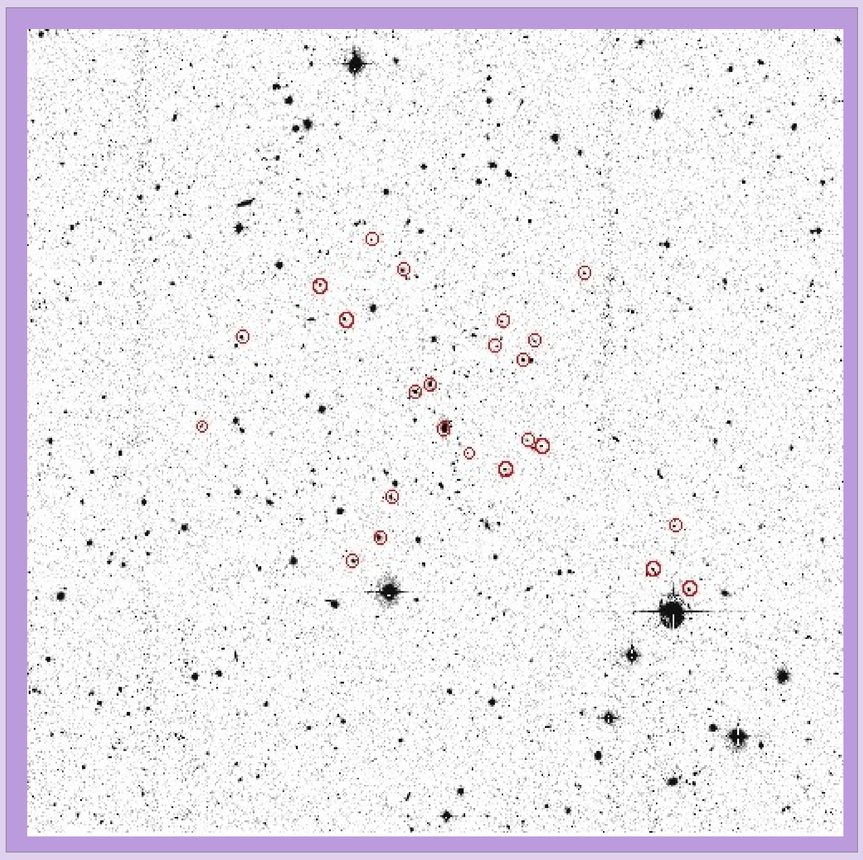

Figure 3: Spatial distribution of group members in SL2SJ02140-0535.

Conclusions

New spectroscopic data for the lens group SL2S J02140-0535 is presented. In a prelimimary analysis we found 24 group members, and a line-of-sight velocity dispersion of 324 ± 91.78 km/s, in good agreemet with previous results.

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