larger by about 31%. When we subdivide the AXU clusters in two subsamples, one with significant and the other with little or no substructure, we find that the former shows red-sequence slopes that are significantly flatter than those for the latter. This points to AXU clusters being younger systems than normal clusters, possibly accreting groups of galaxies, individual galaxies and gas.

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PROPERTIES OF TYPE IA SUPERNOVAE INSIDE RICH GALAXY CLUSTERS

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We used the GMBCG galaxy cluster catalogue and SDSS–II supernovae data with redshifts measured by the BOSS project to identify 48 SNe Ia residing in rich galaxy clusters and compare their properties with 1015 SNe Ia in the field. Their light curves were parametrised by the SALT2 model and the significance of the observed differences was assessed by a resampling technique. To test our samples and methods, we first looked for known differences between SNe Ia residing in active and passive galaxies. We confirm that passive galaxies host SNe Ia with smaller stretch, weaker colour–luminosity relation [β of 2.54(22) against 3.35(14)], and that are ~ 0.1 mag more luminous after stretch and colour corrections. We show that only 0.02 per cent of random samples drawn from our set of SNe Ia in active galaxies can reach these values. Reported differences in the Hubble residuals scatter could not be detected, possibly due to the exclusion of outliers. We then show that, while most field and cluster SNe Ia properties are compatible at the current level, their stretch distributions are different ($\sim 3\sigma$): besides having a higher concentration of passive galaxies than the field, the cluster's passive galaxies host SNe Ia with an average stretch even smaller than those in field passive galaxies (at 95 per cent confidence). We argue that the older age of passive galaxies in clusters is responsible for this effect since, as we show, old passive galaxies host SNe Ia with smaller stretch than young passive galaxies ($\sim 4\sigma$).

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INSTRUMENTATION

BOMBOLO: A MULTI-BAND, WIDE-FIELD, NEAR UV/OPTICAL IMAGER FOR THE SOAR 4M TELESCOPE

R. Angeloni[1,2,3], D. Guzmán[1], T. H. Puzia[2], and L. Infante[1,2]

BOMBOLO is a new multi-passband visitor instrument for SOAR observatory. The first fully Chilean instrument of its kind, it is a three-arms imager covering the near-UV and optical wavelengths. The three arms work simultaneously and independently, providing synchronized imaging capability for rapid astronomical events. BOMBOLO will be able to address largely unexplored events in the minute-to-second timescales, with the following leading science cases: 1) Simultaneous Multiband Flickering Studies of Accretion Phenomena; 2) Near UV/Optical Diagnostics of Stellar Evolutionary Phases; 3) Exoplanetary Transits and 4) Microlensing Follow-Up. BOMBOLO optical design consists of a wide field collimator feeding two dychroics at 390 and 550 nm. Each arm encompasses a camera, filter wheel and a science CCD230-42, imaging a 7 x 7 arcmin field of view onto a 2k x 2k image. The three CCDs will have different coatings to optimise the efficiencies of each camera. The detector controller to run the three cameras will be Torrent (the NOAO open-source system) and a PanView application will run the instrument and produce the data-cubes. The instrument is at Conceptual Design stage, having been approved by the SOAR Board of Directors as a visitor instrument in 2012 and having been granted full funding from CONICYT, the Chilean State Agency of Research, in 2013. The Design Phase is starting now and will be completed in late 2014, followed by a construction phase in 2015 and 2016A, with expected Commissioning in 2016B and 2017A.

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