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RELICS: Discovery of a Probable SN in Galaxy Cluster MACSJ0949.8+1708

ATel #8170; *S. Rodney (U. of South Carolina); L. Bradley, D. Coe, L. Strolger, R. Avila, S. Ogaz, A. Riess (STScI); J. Hjorth, J. Selsing, L. Christensen (DARK); M. Graham, P. Kelly (UC Berkeley); A. Molino (IAG, IAA-CSIC); S. Jha (Rutgers); R. Foley (U. of Illinois); X. Wang (UC Santa Barbara); A. Zitrin, I. Sendra (Caltech); K. Sharon, T. Johnson, R. Paterno-Mahler (U. of Michigan); M. Bradac, A. Hoag (UC Davis); C. Jones, F. Andrade-Santos (SAO); K. Umetsu, N. Czakon (ASIAA); D. Stark, R. Mainali (U. of Arizona); M. Trenti, D. Carrasco Nunez (U. of Melbourne); W. Dawson (LLNL); B. Vulcani (IPMU); and H. Ebeling (IfA, Hawaii)*
on ***15 Oct 2015; 12:43 UT***
Distributed as an Instant Email Notice Supernovae
Credential Certification: Steven A. Rodney (srodney@sc.edu)

Subjects: Infra-Red, Optical, Supernovae, Transient

We report the discovery of a likely supernova (SN) at approximately 1 arcminute from the center of the galaxy cluster MACSJ0949.8+1708 (a.k.a. RXC J0949.8+1707, ZwCl 0947.2+1723). The SN candidate was detected in Hubble Space Telescope (HST) observations collected on Oct 9, 2015 as part of the Reionization Lensing Cluster Survey (RELICS, HST program ID: 14096, PI: D.Coe). The RELICS ID for this object is RLC15Ant (nicknamed "SN Antikythera"). Discovery images and a finder chart for follow-up observations may be downloaded from the RELICS public ftp site (links below).

The SN candidate is visible in 4 infrared bands (F105W, F125W, F140W, F160W) from HST's Wide Field Camera 3 Infrared detector (WFC3-IR) and in the F435W optical band from the Advanced Camera for Surveys (ACS). The candidate is absent in pre-RELICS ACS imaging collected in 2005 and 2011 in the F606W (V) and F814W (I) bands, respectively, as part of the HST SNAPshot survey of massive galaxy clusters (HST PID: 10491 and 12166, PI:Ebeling).

The position of RLC15Ant in J2000 coordinates is :
09:49:48.01 +17:07:23.0
147.45006 17.12307

The most likely host galaxy is a face-on barred spiral galaxy, centered at:
09:49:47.986 +17:07:24.25
147.44994 17.12340

Combining HST photometry of the host galaxy with photometry from the Sloan Digital Sky Survey (SDSS), we have estimated the photometric redshift using the BPZ software (Benitez 2000, ApJ, 536, 571). From BPZ we find the host redshift to be z=0.332 with a 95% confidence range of [0.247,0.429]. This is consistent with the redshift of the nearby cluster MACSJ0949.8+1708 (z=0.383), suggesting that the SN and host galaxy are likely cluster members.

We have measured the SN brightness (in AB magnitudes) from the Oct 9, 2015 data as follows:

F435W (g) 25.1 +- 0.1
F105W (Y) 23.5 +- 0.2
F125W (J) 23.6 +- 0.3
F140W (JH) 23.8 +- 0.4
F160W (H) 24.3 +- 0.6

Additional HST imaging from the RELICS program will be collected in November 2015.

The RELICS imaging from Oct 9, 2015 also provides unambiguous confirmation of the transient nature for two other SN candidates in the same host galaxy. These two candidates were present in the ACS F814W imaging collected on April 23, 2011 in the HST Snapshot survey (PID: 12166), and are absent in all bands of the RELICS images on Oct 9, 2015. The RELICS SN IDs and coordinates are:

RLC11Ele "SN Eleanor"
09:49:47.97 +17:07:24.9
147.44986 17.12359

RLC11Ale "SN Alexander"
09:49:48.07 +17:07:24.0
147.45030 17.12333

This discovery is based on new observations for the RELICS program (HST-GO-14096) using the NASA/ESA Hubble Space Telescope, which were made available by the Mikulski Archive for Space Telescopes at the Space Telescope Science Institute. STScI is operated by the Association of Universities for Research in Astronomy, Inc. under NASA contract NAS 5-26555.

RELICS 3 SN candidates : Discovery images

RELICS Finder Chart for RLC15Ant

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R. E. Rutledge, Editor-in-Chief rrutledge@astronomerstelegram.org
Derek Fox, Editor dfox@astronomerstelegram.org
Mansi M. Kasliwal, Co-Editor mansi@astronomerstelegram.org