

Supplementary Material: *Swift/UVOT follow-up of Gravitational Wave Alerts in the O3 era*

3 August 2021

S.1 UVOT OBSERVED SOURCES OF INTEREST

In this section we provide additional details on each of the sources of interest discovered during the follow up of individual gravitational wave events. These sources were either detected by UVOT or were detected by another facility and were later observed by UVOT. All magnitudes are provided in the AB system and not corrected for extinction. For each GW event we provide times commencing from the GW event trigger time, T₀. These are given in Table 2 in the main paper.

S.1.1 S190412m

S190412m (LIGO Scientific Collaboration & Virgo Collaboration 2019a) was identified as a BBH merger with asymmetric masses (The LIGO Scientific Collaboration et al. 2020). Manual inspection of the thumbnails identified 3 Q0 thumbnails as sources of interest.

Q0_src10 was identified at the 4.0σ level on an image starting T₀+0.59 days with OBSID 07015322001. The object is located at RA, Dec(J2000) = 223.91104, 33.11022 deg with an estimated uncertainty of 0.9 arcsec (radius, 90 per cent confidence). The *u*-band magnitude was 20.32 ± 0.28 mag in a 79s exposure. A second UVOT *u*-band image with an exposure of 543s was taken 14 months after the detection exposure with a consistent magnitude of 20.47 ± 0.12 mag, suggesting this object had not changed in brightness. An archival source is found in multiple catalogues within $1 - 2''$. In SDSS DR12 the archival value is 22.10 ± 0.17 mag in *u* (Alam et al. 2015), 1.78 magnitudes fainter than the UVOT detection, with the UVOT and SDSS magnitudes inconsistent at 5.4σ . Based on archival photometry from SDSS, WISE and GAIA, this source is listed in several catalogues as a candidate AGN or more specifically a low redshift quasar (Abraham et al. 2012; Flesch 2015; Assef et al. 2018; Bailer-Jones, Fouesneau & Andrae 2019). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015). This source has a parallax measurement of 1534 pc with lower and upper bounds of 930 and 2525 pc, computed using the Gaia DR2 (Bailer-Jones et al. 2018). However GAIA data early release 3 does not imply a measurable parallax (Gaia Collaboration et al. 2020).

Q0_src28 was identified at the 4.0σ level on an image starting T₀+0.51 days with OBSID 07015295001. The object is located at RA, Dec(J2000) = 192.35297, 14.90385 deg with an estimated uncertainty of 0.9 arcsec (radius, 90 per

cent confidence). The *u*-band magnitude was 20.16 ± 0.28 mag in a 75s exposure. A second UVOT *u*-band image with an exposure of 438s was taken 14 months after the detection exposure with a consistent magnitude of 20.40 ± 0.15 , suggesting this object had not changed in brightness. This source is identified in several catalogues, including WISE (Cutri & et al. 2012; Cutri et al. 2014). In SDSS this source has two catalogued observations and is labelled as J124924.75+145412.4 and J124924.75+145412.3 (Alam et al. 2015). In the *u*-band the SDSS gives magnitudes for the two observations of 22.90 ± 0.38 mag and 21.56 ± 0.15 mag, at epochs 2003.0760 and 2003.4091 (year), respectively. This is 2.74 and 1.40 magnitudes fainter than the UVOT detection, respectively, with the magnitudes inconsistent with the UVOT at 5.8σ and 4.4σ . This source is listed in several catalogues as a candidate AGN/quasar (Flesch 2015, 2016; Assef et al. 2018; Flesch 2019). Flesch (2016) report a photometric redshift for this object based on SDSS photometry of $z = 1.5$. This object is also detected in the radio and identified as variable (Condon et al. 1998; Ofek & Frail 2011). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q0_src36 was identified at the 3.5σ level on an image starting T₀+0.67 days with OBSID 07015359001. The object is located at RA, Dec(J2000) = 214.56987, 31.35459 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence). The *u*-band magnitude was 20.01 ± 0.24 mag in a 77s exposure. A second UVOT *u*-band image with an exposure of 438s was taken 14 months after the detection exposure with a consistent magnitude of 20.32 ± 0.12 , suggesting this object had not changed in brightness. This source is identified in several catalogues, including WISE (Cutri & et al. 2012; Cutri et al. 2014). In SDSS this source is labelled as J141816.70+312116.9 and has a *u*-band magnitude of 20.96 ± 0.09 mag (Alam et al. 2015). This is 0.95 magnitudes fainter than in UVOT with the magnitudes inconsistent at 3.7σ . This source is listed in several catalogues as a candidate AGN/quasar (Richards et al. 2009, 2015; Brescia, Cavuoti & Longo 2015; Assef et al. 2018; Flesch 2019) or listed as a stellar source (Vasconcellos et al. 2011). The photometric redshift suggested by Weinstein et al. (2004); Richards et al. (2009) is $z_{phot} = 3.675$, while Richards et al. (2015) estimate $z_{phot} = 1.005$. This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

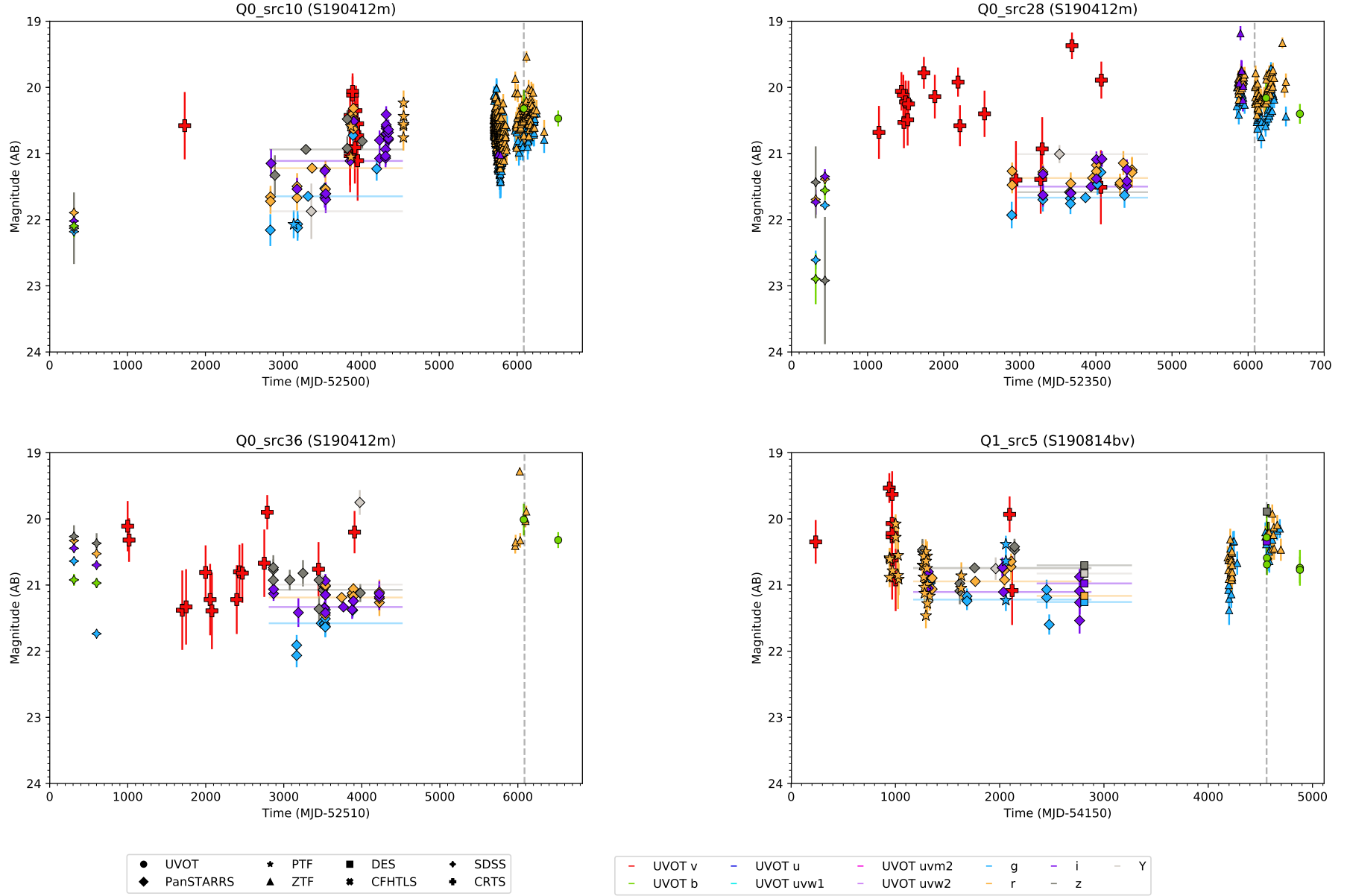


Figure S.1. The light curves of the sources of interest discovered or followed-up with the UVOT that we initially classify as candidate AGN; these sources have been identified in the literature as AGN or candidate AGN. The following information applies to Figs. S.1-S.7. For each panel the source name is given and in brackets the GW event in which the source was discovered. The different filters are given by different colours and the different shapes are used for data from different telescopes, as given in the legends. For stacked exposures we provide a translucent error bar giving the time range. For Pan-STARRS we provide data from both single and stacked exposures. All values are given in AB magnitudes. The grey dashed line indicates the trigger time of the GW alert.

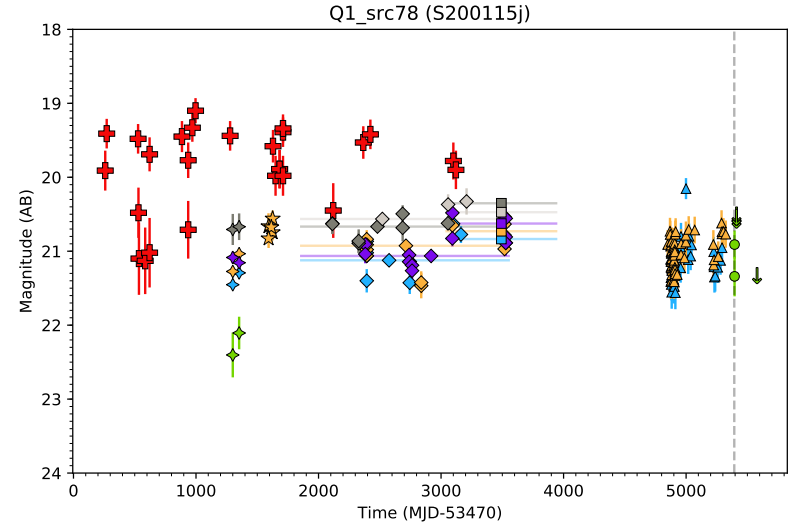
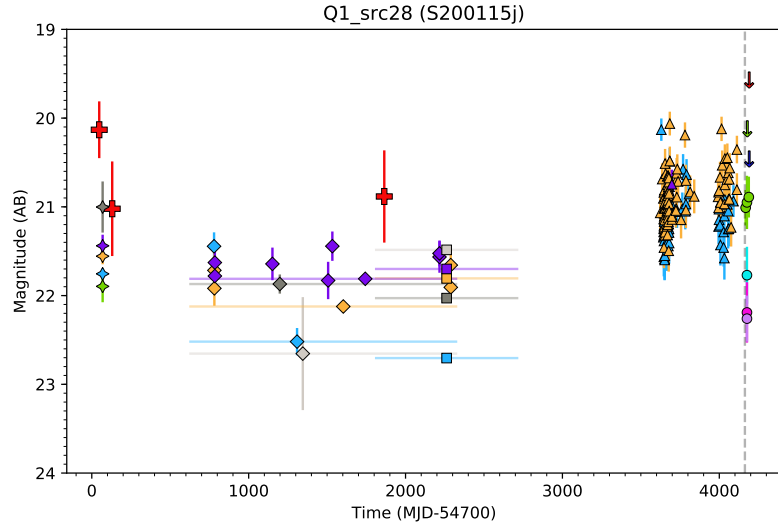
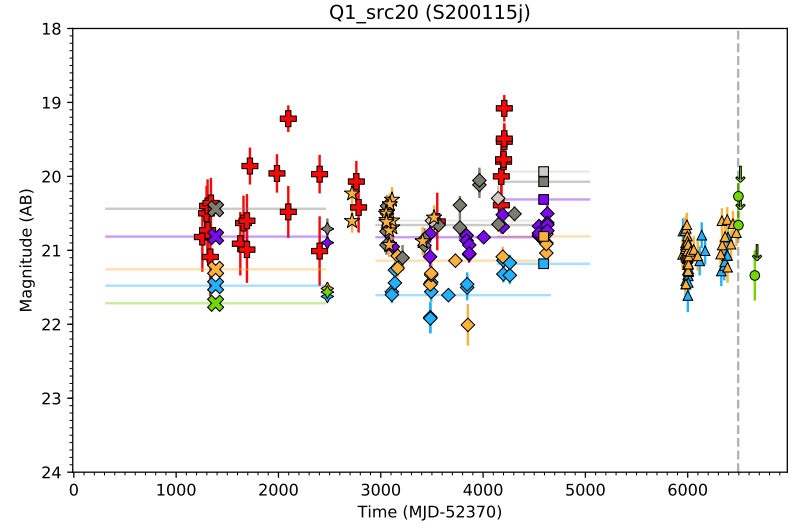
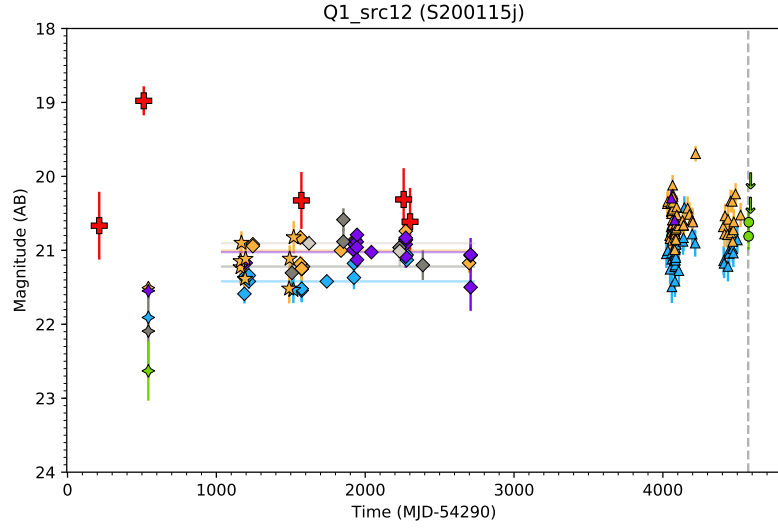


Figure S.2. A continuation of the light curves of the sources of interest discovered or followed-up with the UVOT that we initially classify as candidate AGN; these sources have been identified in the literature as AGN or candidate AGN. See the caption of Fig. S.1 for further details.

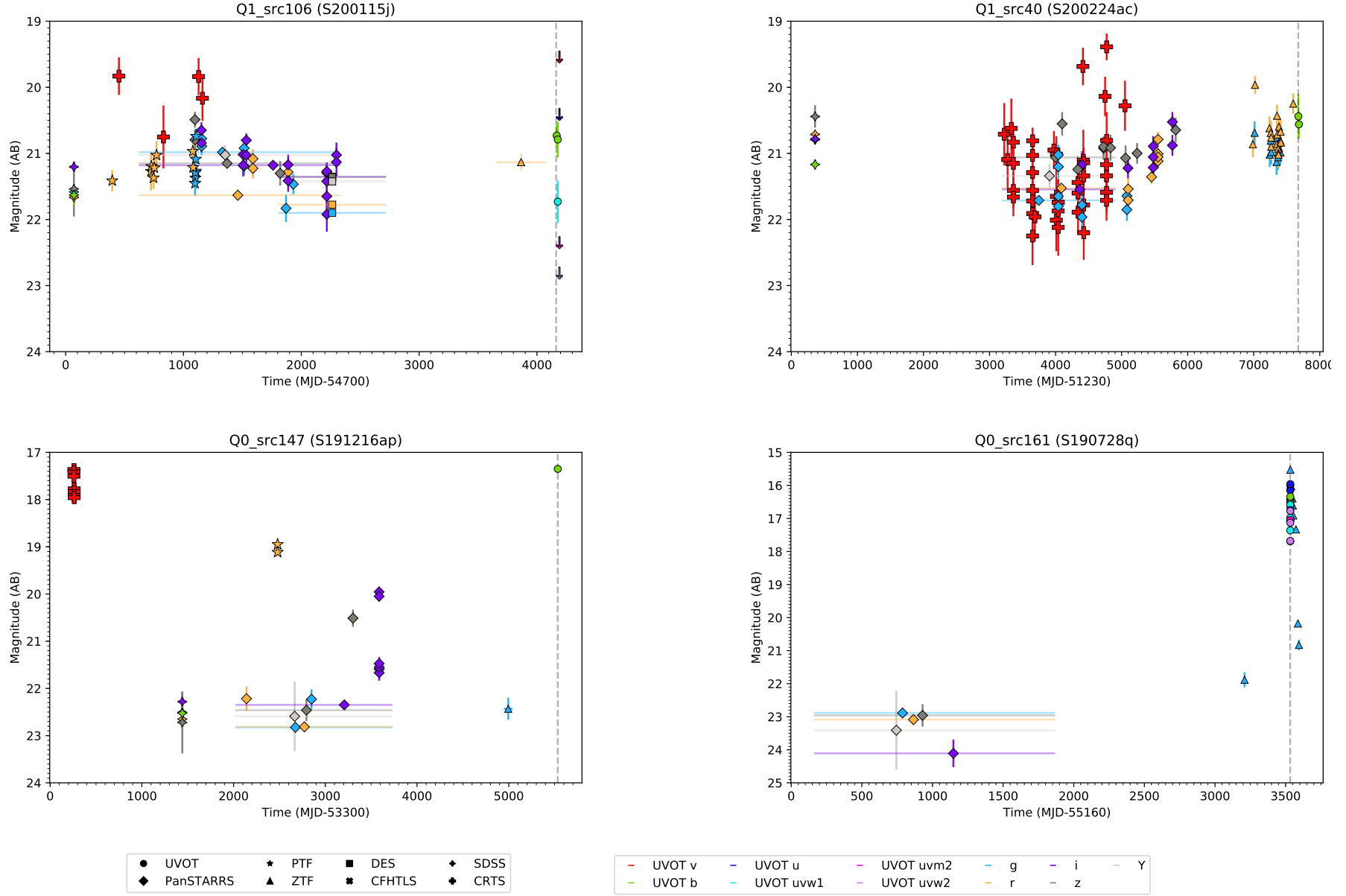


Figure S.3. The top two light curves are for sources of interest discovered or followed-up with the UVOT that we initially classify as candidate AGN; these sources have been identified in the literature as AGN or candidate AGN. The bottom two light curves are of sources of interest discovered or followed-up with the UVOT that have been identified as CVs. See the caption of Fig. S.1 for further details.

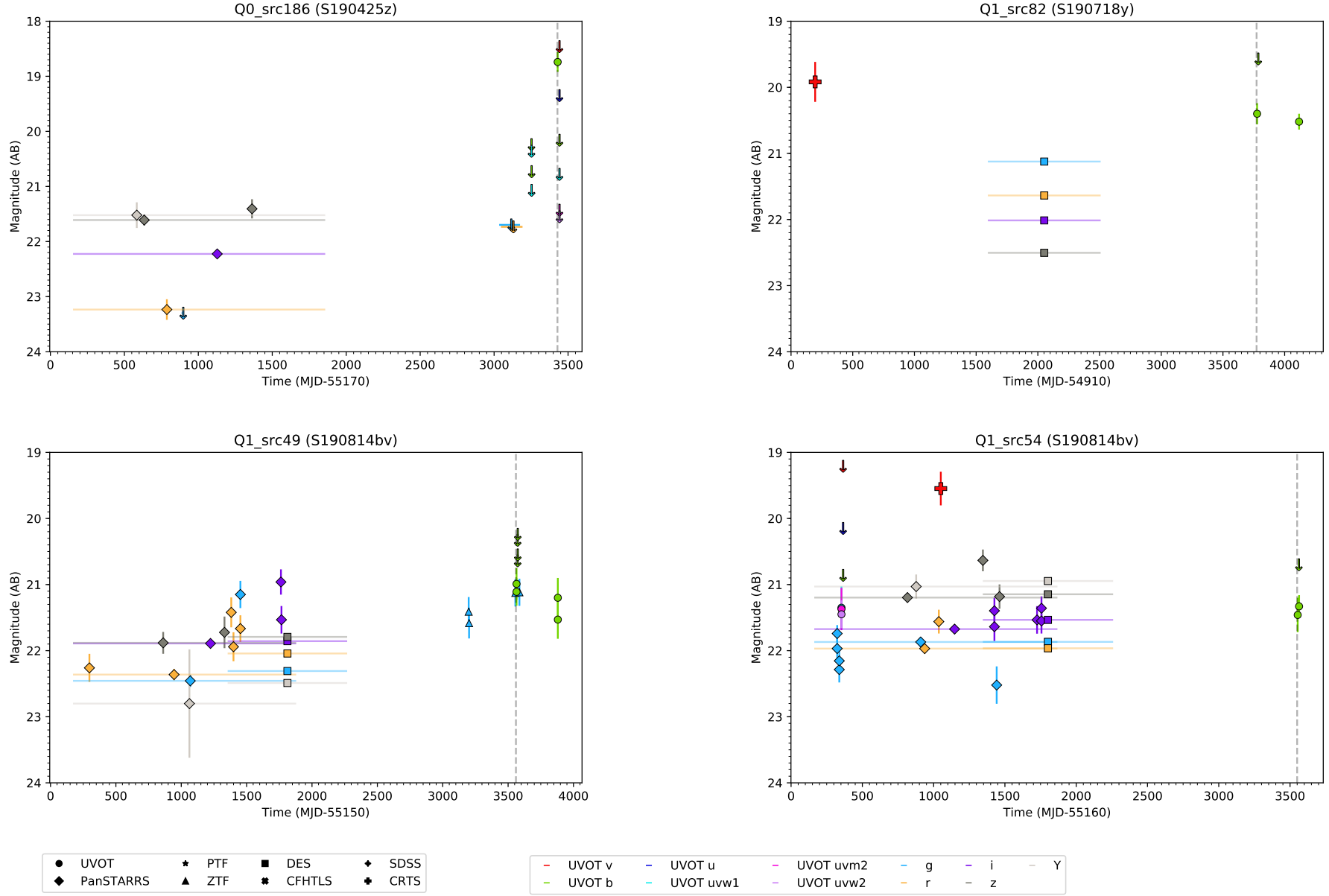


Figure S.4. The light curves of the sources of interest discovered or followed-up with the UVOT that we initially classify as unidentified; these sources have archival optical photometry, but have no classification in the literature. See the caption of Fig. S.1 for further details.

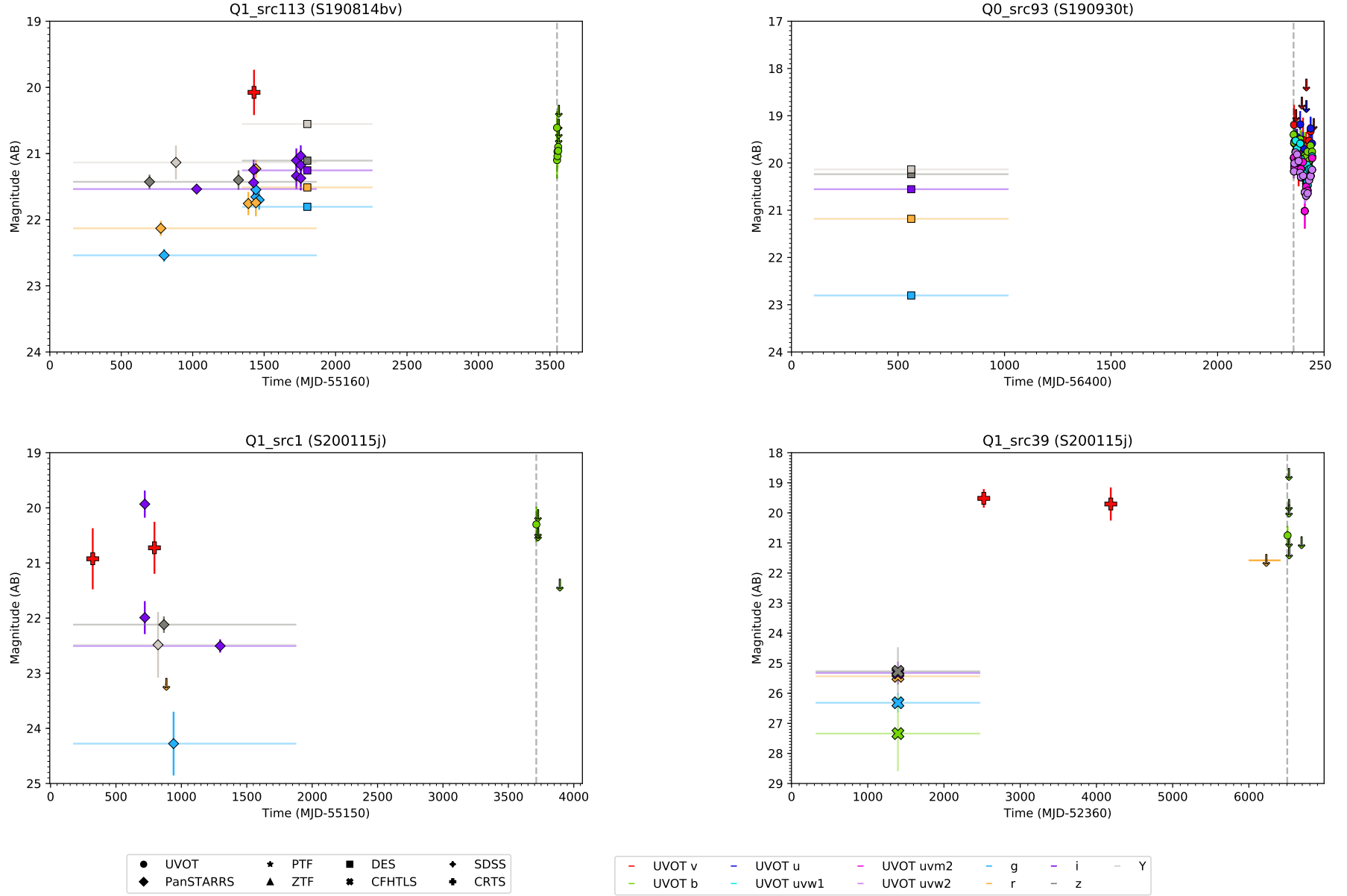


Figure S.5. A continuation of the light curves of the sources of interest discovered or followed-up with the UVOT that we initially classify as unidentified; these sources have archival optical photometry, but have no classification in the literature. See the caption of Fig. S.1 for further details.

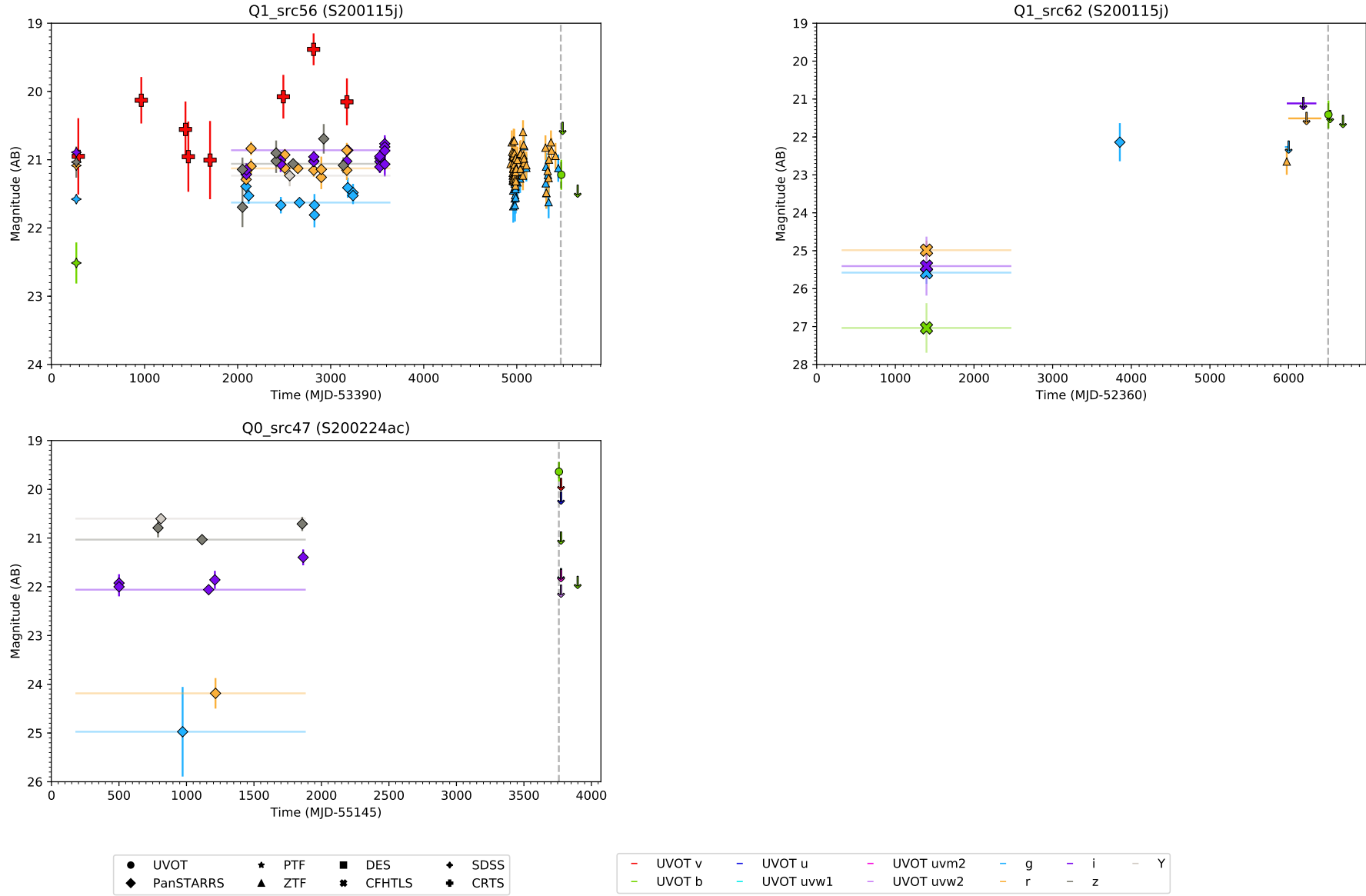


Figure S.6. A continuation of the light curves of the sources of interest discovered or followed-up with the UVOT that we initially classify as unidentified; these sources have archival optical photometry, but have no classification in the literature. See the caption of Fig. S.1 for further details.

S.1.2 S190425z

S190425z (LIGO Scientific Collaboration & Virgo Collaboration 2019b) is a confirmed BNS GW alert. All UVOT sources except two were ruled out through further inspection. UVOT also followed up two sources detected by the Zwicky Transient Facility (ZTF; Bellm et al. 2019; Graham et al. 2019): ZTF19aarykbb, ZTF19aarzaod (Kasliwal et al. 2019a) and one source from the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS; Chambers et al. 2016): AT2019ebq (PS19qp; Smith et al. 2019).

Q0_src186 was identified at the 6.1σ level on an image starting at T0+1.4 days with OBSID 07016575001. The position is RA, Dec(J2000) = 255.58000, -12.48562 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The u -band magnitude was 18.74 ± 0.18 in a 67s exposure. This source, also labelled as *Swift* J170219-122908, was reported in Breeveld et al. (2019). In follow-up UVOT observations starting T0+2.6 days this source was not detected in any filter. The 3σ upper limit in u is > 20.16 mag. As a result of the *Swift* Gravitational Wave Galaxy Survey (SGWGS; Tohuvavohu et al., in prep) we also have a pre-explosion image of this field in the u with a 3σ upper limit of > 20.73 mag; this photometry was initially reported in Tohuvavohu et al. (2019a). The MASTER telescope also reported a detection of this source (Lipunov et al. 2019b), while upper-limits and pre-observations of the field were reported by Kong et al. (2019); Andreoni et al. (2019b); Kong (2019); Waratkar et al. (2019); De et al. (2019); Arcavi et al. (2019); Palmese et al. (2019); Shappee et al. (2019); Im et al. (2019); Hu et al. (2019); Chang et al. (2019); Morihana, Jian & Nagayama (2019); Tanvir et al. (2019); Troja et al. (2019); Bloom et al. (2019); Murison (2019); Kann et al. (2019). The field was also observed by the Palomar Transient Factory (PTF; Law et al. 2009) and ZTF, but nothing was detected in archival images. A source is detected at this location in the Pan-STARRS stacked images.

Q0_src136 was observed at T0+0.45 days in a 73s exposure with OBSID 07016420001. The location is RA, Dec(J2000) = 104.61515, -45.72216 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence). This 3.4σ source had u -band magnitude of 19.39 ± 0.32 mag. A second UVOT u -band image with an exposure of 352s was taken 14 months after the detection exposure resulting in a non-detection with a 3σ upper limit of > 20.31 mag, suggesting this object has faded. This source was not identified in any catalogue. This field has not been observed by Pan-STARRS, PTF or ZTF.

UVOT also performed follow-up observations of three sources identified by ground based observatories: ZTF19aarykbb, ZTF19aarzaod from ZTF (Kasliwal et al. 2019a) and AT2019ebq (PS19qp) from Pan-STARRS (Smith et al. 2019). No UVOT analysis was immediately reported since the ZTF sources were both identified as SN II (Pavana et al. 2019; Perley, Copperwheat & Taggart 2019; Buckley et al. 2019b; Izzo et al. 2019a; Wiersema et al. 2019; Nicholl et al. 2019a; Castro-Tirado et al. 2019a) at a redshift of 0.025 and 0.028 respectively, and AT2019ebq was identified as SN Ib/Ib (Nicholl et al. 2019b; Jonker et al. 2019; Morokuma et al. 2019; Jenson et al. 2019) at a redshift of 0.037. However, we include the photometry in Table S.1. ZTF19aarykbb is coincident with the galaxy 2MASX

J17132113-0957536 (Skrutskie et al. 2006). ZTF19aarzaod is near to galaxy 2MASX J17311017-0827103 (Skrutskie et al. 2006) and AT2019ebq is coincident with the galaxy 2MASS J17011849-0700102 (Nicholl et al. 2019b). No attempt has been made to subtract the host flux from the magnitudes.

S.1.3 S190426c

S190426c is likely terrestrial in origin, but initially had a high likelihood of being a BBH merger (LIGO Scientific Collaboration & Virgo Collaboration 2019c,d). After manual inspection no UVOT sources were of interest or were considered to be the EM counterpart to the GW (Kuin & Swift Team 2019). However, *Swift* performed follow-up observations of one external candidate of interest ZTF19aassfws (Perley et al. 2019).

ZTF19aassfws was detected by ZTF on 28th April 2020 with an r -band magnitude of 21.41 ± 0.20 . It was found to be close to the galactic nucleus of the host galaxy (Perley et al. 2019). An optical spectrum showed a red stellar continuum, along with a series of nebular emission lines which indicated a spectroscopic redshift of $z = 0.093$ (Cenko et al. 2019). Optical photometry was also obtained by Fremming et al. (2019b); Huber et al. (2019). X-ray and radio non-detections were reported by NICER, VLA and AMI-LA (Pasham et al. 2019; Corsi et al. 2019; Rhodes et al. 2019) with pre-GW VLA radio observations reported by Dong et al. (2019). Kasliwal et al. (2020) later reported that this candidate was not astrophysical, but an artefact induced by a gain mismatch across the image. For completeness we include the UVOT photometry at the location of the artefact ZTF19aassfws in Table S.1, but we do not include this source in the discussion.

S.1.4 S190510g

This source was initially reported as a high probability BNS merger in LIGO Scientific Collaboration & Virgo Collaboration (2019e) but was revised more than a day later as having a high likelihood of being terrestrial in origin (LIGO Scientific Collaboration & Virgo Collaboration 2019f). No sources were considered of interest after manual inspection. However, in Ohgami et al. (2021), an external candidate was reported: Cand-A09, which was observed by Subaru/Hyper Suprime-Cam. Reviewing the UVOT images it was noted that this source was also observed during the tiling performed by UVOT, however, this source did not pass the pipeline checks in order for a thumbnail to be produced.

Cand-A09 was observed on an image with OBSID 07018496001 taken at T0+0.3 days. The u -band magnitude was 17.11 ± 0.07 in 62s exposure. A second UVOT u -band image with an exposure of 478s was taken T0+2 years gave a magnitude of > 21.78 mag, indicating this source has faded. In Subaru this source was detected with a magnitude of 17.50 mag in the Y-band (Ohgami et al. 2021). This source was not identified in any catalogue. Pan-STARRS and ZTF observed this field, no source is found within the archival images. The ZTF limiting magnitudes, from stacked images taken between March 2018 and June 2019 are 22.30, 22.07, 21.20 mag in the g , r and i bands, respectively.

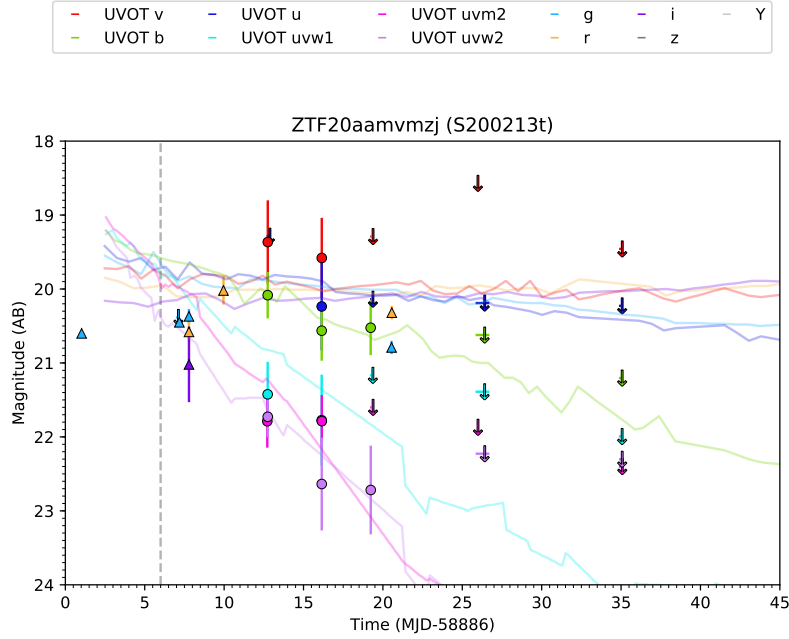


Figure S.7. The light curve of ZTF20aamvmzj, which was detected by ZTF during the search of GW alert S200213t. This is a source of interest discovered or followed-up with the UVOT that we initially classify as unclassified; these sources have not been identified in the literature and do not have archival optical photometry. This figure includes photometry from UVOT (filled circles) and Kasliwal et al. (2020) (triangles). For comparison we also display the photometry of ASASSN-14ha (Valenti et al. 2016), which was obtained from the Open Supernova Catalog (Guillochon et al. 2017), given as solid lines. The colours indicate the filters: *v* (red), *b* (green), *u* (blue), *uvw1* (cyan), *uvw2* (magenta), *uvw2* (lilac), *g* (light blue), *r* (orange), *i* (purple), *z* (dark grey), *Y* (light grey). We have scaled the light curves of ASASSN-14ha by 6 magnitudes, corresponding to a factor ≈ 16 in distance and have adjusted the times of ASASSN-14ha to best match the light curves best of ZTF20aamvmzj. The similarity suggests ZTF20aamvmzj is most likely a SN II at a distance ~ 350 Mpc.

S.1.5 S190718y

S190718y (LIGO Scientific Collaboration & Virgo Collaboration 2019g) had a high probability of being terrestrial in origin, but also had a small chance of being a BNS. Only one source remained after manual inspection.

Q1_src82 was identified on an image with OBSID 07019580002, observed at $T_0 + 4.2$ days. The position is RA, Dec(J2000) = 336.33604, -55.99178 deg with an estimated uncertainty of 0.6 arcsec (radius, 90 per cent confidence). The *u*-band magnitude was 20.40 ± 0.16 in 478s exposure. This source was not detected in a shorter 80s, earlier exposure, taken at $T_0 + 0.20$ days with OBSID 07019580001, giving a 3σ upper limit > 19.57 mag. A second UVOT *u*-band image with an exposure of 822s was taken 11 months after the detection exposure with a consistent magnitude of 20.52 ± 0.12 , suggesting this object had not changed in brightness. In the Dark Energy Survey (DES) a catalogued source, J222520.64-555930.2, is found consistent with the location of this source. The archival magnitude is $g = 21.12$ mag (Abbott et al. 2018). The UVOT magnitude suggests the source has brightened by 0.72 magnitudes compared to the DES source, with the two magnitudes inconsistent at 4.5σ . The DES extended source flag in the *g*-band suggests this object has a galaxy profile. This field was not observed by Pan-STARRS, PTF or ZTF.

S.1.6 S190728q

S190728q (LIGO Scientific Collaboration & Virgo Collaboration 2019h) had a high chance of being a BBH and a 5 per cent chance of one of the remnants having a mass within the mass gap. After manual inspection only 1 Q0 source of interest remained. This source is a result of a ToO upload of an object initially reported by ZTF as ZTF19abjethn (AT2019lvs; Kasliwal et al. 2019b). ZTF serendipitously observed the location of this source the previous night, with no detection. This object was identified as a CV (Smartt et al. 2019a) and as such no UVOT GCN was released, however for completeness we include the photometry in Table S.1. This source is also listed in the SDSS DR12 archive with a *u*-band magnitude of 23.91 ± 0.93 mag (Alam et al. 2015). Compared to the brightest UVOT *u*-band magnitude this suggests the CV brightened by 7.4 magnitudes. This is morphologically classed as a galaxy in SDSS DR12 (Alam et al. 2015).

S.1.7 S190814bv

S190814bv is likely the merger of a BH with a compact object, with it being either the lightest black hole or the heaviest NS yet discovered (Abbott et al. 2020). Upon manual inspection only 4 Q1 sources were considered to be of interest. UVOT also followed up 1 source detected by ASKAP: ASKAP 005547-270433 (AT2019osy Stewart et al. 2019).

UVOT exposures of the ASKAP source ASKAP 005547-270433 (AT2019osy; Stewart et al. 2019) are given

in OBSID 07400044001 and 07400044002. At the location of the ASKAP 005547-270433, no new optical/UV source can be discerned from the underlying host galaxy, 2dFGRS TGS211Z177 (Colless et al. 2001). From the two sets of stacked observations with exposure 1949s and 2717s taken at T0+12.8 days and T0+13.2 days, we obtain a 3σ upper limit of > 24.47 and a 3.4σ detection of 22.76 ± 0.33 mag. These values have not been corrected for the underlying host galaxy. Using the IR, radio and X-ray luminosity of AT2019osy along with the small ($\sim 1''$) offset from the optical centroid of 2dFGRS TGS211Z177, Dobie et al. (2019) suggests that this source is a variable low-luminosity AGN.

Q1_src5 was identified on an image with OBSID 07021010003 taken T0+3.7 days. The position is RA, Dec(J2000) = 13.27599, -25.38296 deg with an estimated uncertainty of 0.6 arcsec (radius, 90 per cent confidence). The u -band magnitude is 20.69 ± 0.16 mag giving a 7.3σ detection in a 503s exposure. This location was also observed 3 times previously during the GW tiling. This source was not detected at T0+0.14 days, T0+0.86 days and T0+1.4 days, with 3σ upper limits of > 20.14 , > 20.64 and > 20.56 . These are short exposures of 39s, 78s and 73s, respectively. This source was also identified in Pan-STARRS with g -band magnitude of 21.59 ± 0.25 mag. Comparison of this archival value with the UVOT detection suggests this source is brighter by 0.9 magnitudes at the 3.0σ level. This source is listed as a candidate AGN from the WISE colours (Assef et al. 2018), but using DES optical photometry this object is also listed as a candidate RR lyrae star with a period of 0.5 days and a distance modulus of 20.34 mag (Stringer et al. 2019). This source was also identified as being transient by the DECAM-GROWTH team on the 2019Aug16 at 07:39:21.000 and was reported to the Transient Name Server¹ (TNS) and given the TNS name AT2019nrf (Andreoni & Goldstein 2019). A follow-up observation was performed at T0+10 months which resulted in a u -band magnitude of 20.77 ± 0.20 mag consistent with no change between this observation and the UVOT detection exposure.

Q1_src49 was identified on an image taken at T0+4.5 days with OBSID 07021240003. The position is RA, Dec(J2000) = 11.34316, -24.46617 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The u -band magnitude is 21.11 ± 0.21 mag giving a 5.4σ detection in a 480s exposure. This source was not detected in two earlier visits at T0+0.48 days and T0+1.3 days, with 3σ upper limits in u of > 20.64 and > 20.55 , but these are shorter exposures of 78s and 65s, respectively. This source was also identified in Pan-STARRS, object ID 78640113434510974, with r -band magnitude of 22.11 ± 0.16 . Compared to the UVOT this implies this source has brightened by 1.0 magnitude at the 3.8σ level. This source is also observed by DES in the g -band with a magnitude of 22.31. Compared to the UVOT this implies this source has brightened by 1.2 magnitudes at the 5.7σ level.

Q1_src54 was identified on an image taken T0+13.5 days with OBSID 07400043001. The position is RA, Dec(J2000) = 13.67442, -24.89507 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The u -band magnitude is 21.33 ± 0.17 mag giving a 6.5σ

detection in a 967s exposure. This source was not detected in an earlier short exposure of 79s taken at T0+0.54 days giving a 3σ upper limit of > 20.70 , but was detected in an prior exposure of 503s at T0+3.9 days with 21.46 ± 0.26 in the u -band. This source was also observed by UVOT in 2010 with the following magnitudes: $uvw1$: 21.35 ± 0.32 in 191s, $uvm2$: 21.37 ± 0.32 232s, $uvw2$: 21.45 ± 0.21 in 382s, and upper limits from short (95s) exposures: $u > 20.86$, $b > 20.15$, $v > 19.21$. This source is identified in the Pan-STARRS catalogue, object ID 78120136744266214, with g -band magnitude of 22.21 ± 0.06 mag. Compared to the UVOT detection at T0+13.5 days this indicates the source brightened by 0.9 magnitudes at the 4.8σ level.

Q1_src113 was found in OBSID 07400037002 starting T0+8.2 days. The position is RA, Dec(J2000) = 11.87052, -24.22461 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The 963s image gave a 8.7σ detection with a u -band magnitude of 20.96 ± 0.13 mag. This source was detected as a result of an upload to observe Swift J004716.2-241, an XRT source. However, Q1_src113 was also observed in 4 observations taken as part of the tiling of S190814bv. Of these exposures, in the longest two, taken at T0+0.20 days and T0+3.3 days (261s and 545s), this source is detected at a magnitude consistent within 1σ of the detection flagged by the UVOT pipeline. A Pan-STARRS catalogued source, object ID 78930118705050688, is found consistent with the location of this source. The archival magnitude is $g = 21.70 \pm 0.04$ mag. The UVOT magnitude suggests the source has brightened by 0.64 magnitudes compared to the Pan-STARRS source, with the two magnitudes inconsistent at 4.7σ .

S.1.8 S190930t

S190930t is a candidate BH-NS merger (LIGO Scientific Collaboration & Virgo Collaboration 2019i). Manual inspection identified 3 Q0 sources, 1 Q1 source and 1 galaxy as sources of interest. *Swift* also follow-up one source detected by ZTF: ZTF19acbqqlh.

Q1_src33 was identified on an image taken at T0+0.60 days with OBSID 07021800001. The position is RA, Dec(J2000) = 154.41967, 34.98805 deg with an estimated uncertainty of 1.0 arcsec (radius, 90 per cent confidence). The u -band magnitude is 19.14 ± 0.33 mag giving a 3.3σ detection in a 69s exposure. This source was not detected in a later exposure of 70s taken at T0+0.86 days giving a 3σ upper limit of > 19.35 , nor in a 282s exposure taken 10 months after the detection exposure with a 3σ upper limit of > 20.75 . This source was not identified in any catalogue. Pan-STARRS and ZTF observed this field, no source is found within the archival image. The ZTF limiting magnitudes, from stacked images taken between Feb 2018 and June 2018 are 22.34, 22.38, 21.37 mag in the g , r and i bands, respectively.

Q0_src93, also labelled as Swift J221951-484240 (Oates et al. 2019b), was detected in a 76s exposure with OBSID 07021582001 starting at T0+14.37k. The position is RA, Dec(J2000) = 334.96599, -48.71116 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). This 5.6σ source had u -band magnitude of 19.48 ± 0.20 mag (Oates et al. 2019b). This source was not listed in Gaia DR1, GSC2.3 or 2MASS catalogues nor listed as a minor planet.

¹ <https://www.wis-tns.org/>

However, a faint unresolved counterpart consistent with this position was identified in the DSS archival image and in the catalogues of the Dark Energy Camera Legacy Survey (DECaLS²; Dey et al. 2019), VISTA (McMahon et al. 2013) and ALLWISE (Cutri et al. 2014). The DES source in g -band is 21.18 mag. The UVOT u -band detection magnitude is 1.7 magnitudes brighter than the DES g -band and are inconsistent at $\sim 8\sigma$. Initially it was suggested that this source was a flare of a red dwarf star. However follow-up observations, performed by UVOT at T0+2.1 days (Oates et al. 2019c), showed the source was blue and at a consistent magnitude ($u = 19.67 \pm 0.22$). Follow-up observations of this source was also performed by J-GEM (Kamei et al. 2019), Chilescope observatory (Belkin et al. 2019) and spectrally with SALT (Buckley et al. 2019a). The redshift of this source is unknown as no spectral features could be identified. Since detection *Swift* has been performing weekly monitoring this source. A discussion of this source will be performed in a follow-up paper (Oates et al., in prep).

The thumbnail of galaxy LEDA128304 (Paturel et al. 1989), in OBSID 07021863001, was identified as having a bright spot at the edge of the disk, compared to the archival DSS image. The centre of the bright spot is at a position RA, Dec(J2000) = 341.82542, -58.24744 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). This 5.2σ source had an initial u -band magnitude of 19.84 ± 0.22 mag at T0+0.70 days. This source was announced via Tohuvavohu et al. (2019b) to the TNS and given the designation AT2019sbk. At T0+3.6 days the source was no longer apparent (Oates et al. 2019d), with the magnitude at that location having faded to 20.67 ± 0.25 mag. Comparison of the magnitude at T0+3.6 days with those after T0+6.5 days shows consistent magnitudes suggesting that the observation at T0+3.6 days is already dominated by the host flux. In order to obtain host subtracted magnitudes for the early observations, we stack the data taken after T0+6.5 days. In Table S.1, we provide magnitudes for all observations before host subtraction and host subtracted values for the observations taken before T0+6 days. After host subtraction the source in the u -band detection exposure is not significant (2.3σ). For completeness we include the UVOT photometry of AT2019sbk in Table S.1, but we do not include this source in the discussion.

UVOT took u -band observations of ZTF19acbpqlh (AT2019rpn; Stein et al. 2019a) beginning T0+1.7 days. In a summed exposure of 1943s, a point source was detected within the halo of a bright star with a u -band magnitude 20.39 ± 0.09 mag. There is also a short 60s u -band observation of this field taken 2.7 years prior giving a 3σ upper limit of > 20.08 mag. This source has been confirmed as a SN II with the host galaxy at a redshift $z = 0.026$ (Kasliwal et al. 2020). Observations of this source were also reported by Morokuma, Utsumi & J-GEM Collaboration (2019); Tan et al. (2019); Karambelkar et al. (2019); Smartt et al. (2019c,b); Mazaeva et al. (2019b,a).

S.1.9 S191213g

S191213g was identified as a likely BNS merger (LIGO Scientific Collaboration & Virgo Collaboration 2019j). No formal tiling was initiated by *Swift*, however four candidates were followed up, three reported by ZTF: ZTF19acykzsk (Andreoni et al. 2019a), ZTF19acyldun (AT2019wrt; Stein et al. 2019b) and ZTF19acymixu (AT2019wrr; Stein et al. 2019b), and one candidate reported by Pan-STARRS PS19hgw (AT2019wxt; McBrien et al. 2019).

For ZTF19acykzsk: UVOT took observations beginning T0+1.7 days. A point source was detected in the b , u , $uvw1$, $uvm2$ and $uvw2$ filters, but not in the v -band. For the v and b filters only, the host galaxy is observed. We provide host-subtracted photometry by measuring the flux using the same aperture positioned at a different location on the host galaxy, but at a similar brightness. ZTF19acykzsk was spectroscopically classified as a SN II using GMOS-N (Fremling et al. 2019a) and GRAWITA TNG (Elias-Rosa et al. 2019). At the location of ZTF19acykzsk it was not clear a point source is present and so preliminary upper limits were provided (Oates et al. 2019e). The host galaxy, UGC 1685, at a redshift $z = 0.020528$, is detected in all filters. In this paper, we have obtained host-subtracted photometry of this source by measuring the flux using the same aperture positioned at a different location on the host galaxy, but at a similar brightness, which gives $> 3\sigma$ detections in the u and UV filters.

For ZTF19acyldun (AT2019wrt), UVOT observations began at T0+2.7 days. For this event the host can be clearly seen in the v and b filters, we provide host-subtracted photometry of this source by measuring the flux using the same aperture positioned at a different location on the host galaxy, but at a similar brightness. The host galaxy, 2MASX J05164834-0728347 (Skrutskie et al. 2006), at a redshift of $z = 0.057273$ (Jones et al. 2009) is consistent with distance of S191213g (Stein et al. 2019b). Xu et al. (2019) claim that the optical/NIR behaviour is largely not consistent with a decaying afterglow of a short GRB and suggest other scenarios such as a supernova or an emerging kilonova. However, Castro-Tirado et al. (2019b) suggest this to be a luminous blue variable in the associated galaxy. After further observations during the evolution of this source, it was classified by Kasliwal et al. (2020) as a SN IIn.

For ZTF19acymixu (AT2019wrr), UVOT observations began at T0+2.7 days. A point source is observed in the v and b filters only, with upper limits in the bluer filters. The images in the UV filters, however, fall into the patches with reduced sensitivity. This source was also observed by *Swift* serendipitously between August and December 2019 with single visits in each of the u and UV filters giving 3σ upper limits consistent with or slightly deeper than the observations at T0+2.7 days. This was classified as a SN Ia with spectroscopic redshift $z = 0.14$ (Kasliwal et al. 2020).

Swift also followed up the Pan-STARRS discovered object, PS19hgw (AT2019wxt; McBrien et al. 2019). UVOT took observations of PS19hgw beginning T0+5.7 days and detected the source above the host galaxy level in all filters (Oates et al. 2019a). In June 2020, we obtained additional observations of the field of view of PS19hgw. Using these template observations we measured the host contribution to the aperture of PS19hgw and used that to obtain

² <http://legacysurvey.org/decamls/>

host-corrected photometry, which we provide in Table S.1. Spectroscopic follow-up of this source indicated this was a SN IIB (Izzo et al. 2019b; Srivastav & Smartt 2019; Müller Bravo et al. 2019; Dutta et al. 2019; Vogl et al. 2019; Val-lery 2019; Becerra-Gonzalez & a larger collaboration 2019; Valeev, Castro-Rodriguez & a larger collaboration 2019) at a redshift $z = 0.036$.

S.1.10 S191216ap

S191216ap (LIGO Scientific Collaboration & Virgo Collaboration 2019k,l) was identified as a BBH merger. After manual inspection, only 1 source remained of interest, this Q0 source, Q0_src147 was found in a 53s exposure with OBSID 07030158001 starting at T0+0.42 days. The position is RA, Dec(J2000) = 322.0254, 2.5390 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). It had a u -band magnitude of 17.35 ± 0.08 mag. This source was also reported by MASTER (Lipunov et al. 2019a) and is consistent with the CV CSS 151110: 212806 + 023221. The TNS name is AT2018cbn. In SDSS DR12, two objects are at a similar distance from Q0_src147 at separations of 0.49'' and 0.53''. The nearest is morphologically classed as a galaxy, while the second source is classed as a star. The archival SDSS u -band magnitude of the stellar source is 22.54 ± 0.30 and in the AAVSO International Variable Star Index (Watson, Henden & Price 2006), this CV is reported to have a minimum of 22.6 mag in the V-band implying the source brightened by > 4 magnitudes. The SDSS and UVOT values are inconsistent at $> 5\sigma$.

S.1.11 S200114f

S200114f (LIGO Scientific Collaboration & Virgo Collaboration 2020a) was an unmodelled trigger. After manual inspection one Q0 source remains.

Q0_src201 is found in an image taken at T0+0.94 days with OBSID 07024090001. The position is RA, Dec(J2000) = 109.68957, 19.74418 deg with an estimated uncertainty of 0.5 arcsec (radius, 90 per cent confidence). The magnitude of this source in the u -band is 17.68 ± 0.09 mag. The position is consistent with MASTER OT J071845.44+194439.4 (AT2020ae; ASASSN-20ab; ZTF20aabpei; Pogrosheva et al. 2020) a CV reported 13 days prior. This source is also classified as a CV in the TNS (Benetti 2020). In the AAVSO International Variable Star Index (Watson, Henden & Price 2006), this CV is reported to have a minimum of 22.8 mag in g -band. Compared to the UVOT u -band detection magnitude this suggests that this source has brightened by almost 5 magnitudes. PTF and ZTF have also observed this field, no source is found within archival images.

S.1.12 S200115j

S200115j (LIGO Scientific Collaboration & Virgo Collaboration 2020b) was classified as a mass gap merger, implying that one of the compact objects likely had a mass of between 3 and 5 M_{\odot} . In manual inspection, 10 Q1 sources remained of interest.

Q1_src1 was found at a RA, Dec(J2000) = 43.28997,

10.15932 deg with an estimated uncertainty of 1.0 arcsec (radius, 90 per cent confidence) in OBSID 07030887001 starting T0+0.70 days. The 75s image gave a 3.4σ detection with a u -band magnitude of 20.30 ± 0.32 mag. In a 76s image taken 1.5hrs earlier (T0+0.64 days), this source is not detected down to a 3σ upper limit > 20.44 nor is it detected in 2 further short exposures taken about 6 hours after the detection flagged by the UVOT pipeline. ZTF observed this field, no source is found within the archival images. The ZTF limiting magnitudes, from stacked images taken between July 2018 and Sept 2019 are 22.27, 22.38, 22.13, 21.49 mag in the g, r, i, z bands respectively. A source is however detected in stacked exposures from Pan-STARRS in the r, i and z filters. The r -band magnitude of 23.24 ± 0.19 . Comparing this r -band magnitude to the UVOT u -band detection suggests the source brightened by almost 3 magnitudes. A WISE catalogued source, J025309.50+100933.5, is also found consistent with the location of this source (Cutri et al. 2014; Schlafly, Meisner & Green 2019).

Q1_src12 was found at a RA, Dec(J2000) = 36.20419, -6.08018 deg with an estimated uncertainty of 0.6 arcsec (radius, 90 per cent confidence) in OBSID 07030708002 starting T0+2.8 days. The 493s image gave a 6.4σ detection with a u -band magnitude of 20.81 ± 0.18 mag. This source is not detected in 2 shorter earlier u -band exposures of 79s and 74s taken T0+0.28 days and T0+1.7 days which give 3σ upper limits of > 20.39 mag and > 20.06 mag. However, the source is detected at a consistent magnitude in a 507s u -band exposure taken at T0+4.2 days. A SDSS DR12 catalogued source, J022448.99-060448.9, is found consistent with the location (Alam et al. 2015). The archival magnitude is $u = 22.63 \pm 0.40$ mag. The UVOT magnitude suggests the source has brightened by 1.8 magnitudes compared to the SDSS catalogue at the 4.1σ level. This source is listed in several catalogues as a candidate AGN/quasar (Richards et al. 2015; Flesch 2016; Assef et al. 2018). This is also listed in the catalogue of RR lyrae stars with a period of 0.60 days and a distance modulus of 20.32 mag (Stringer et al. 2019). Using the SDSS photometry a photometric redshift of $z = 1.100$ has been determined for this object and it is also found to be associated with a weakly detected *XMM-Newton* X-ray source, J022448.9-060448, with a flux $6.72 \pm 5.88 \times 10^{-14}$ erg cm $^{-2}$ s $^{-1}$ in the 0.2-12 keV energy range (Flesch 2016, 2019; Webb et al. 2020). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q1_src20 was found in an image starting T0+2.9 days with OBSID 07030707002. The position is RA, Dec(J2000) = 36.65736, -5.86179 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The 536s image gave a 6σ detection with a u -band magnitude of 20.66 ± 0.19 mag. In an 80s image taken earlier at T0+0.28 days, this source is not detected down to a 3σ upper limit > 20.34 . A SDSS catalogued source, J022637.75-055141.6, is found consistent with the location of this source (Alam et al. 2015). The archival magnitude is $u = 21.56 \pm 0.13$ mag. The UVOT magnitude suggests the source has brightened by 1 magnitude compared to the SDSS catalogue with the two magnitudes inconsistent at 3.9σ . This source is listed in several catalogues as a candidate AGN/quasar (Brescia, Caviuoti & Longo 2015; Flesch 2015, 2016, 2019). The SDSS catalogue gives a spectroscopic redshift for this object at

$z = 0.72925$ (Alam et al. 2015). Brescia, Caviuoti & Longo (2015) identify this source through spectroscopy as a broad-line AGN. This source is also found to be associated with an *XMM-Newton* X-ray source, J022637.5-055142, with a flux $2.64 \pm 0.64 \times 10^{-14} \text{ erg cm}^{-2} \text{ s}^{-1}$ in the 0.2-12 keV energy range (Rosen et al. 2016; Flesch 2016, 2019; Webb et al. 2020). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q1_src28 was identified on an image taken at T0+4.7 days with OBSID 07031091002. The position is RA, Dec(J2000) = 40.37844, -1.37120 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence). The 501s image gave a 5.5σ detection with a *u*-band magnitude of 20.01 ± 0.20 mag. This source was also observed 3 days prior with the initial tiling, but the exposure was short (74s) and the source was not detected with a 3σ upper limit of > 20.13 mag. A follow-up observation was performed in all filters with *Swift*/UVOT starting at T0+13.1 days, see Table S.1, the source was detected in the *u* and UV filters only. The non detection in the *v* and *b* filters may be due to the shorter amount of exposure time (231s each). A fourth UVOT visit was performed in the *u* filter at T0+25 days, this gave a *u*-band magnitude of 20.89 ± 0.23 mag consistent with the discovery magnitude suggesting this source did not change in brightness over the course of 20 days. A SDSS catalogued source, J024130.85-012216.3, is found at a consistent location (Alam et al. 2015). The archival magnitude is $u = 21.90 \pm 0.18$ mag. Comparing this archival value with the UVOT detection magnitude suggests the source has brightened by 0.9 magnitudes, with the two values inconsistent at 3.3σ . This source is listed in several catalogues as a candidate AGN/quasar (Brescia, Caviuoti & Longo 2015; Assef et al. 2018; Pâris et al. 2018; Flesch 2019; Liao et al. 2019). The SDSS quasar catalogue gives a spectroscopic redshift for this object at $z = 1.502008$ (Pâris et al. 2018). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q1_src39 was found on an image with OBSID 07031054002 starting T0+4.0 days. The position is RA, Dec(J2000) = 36.19785, -7.93239 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence). The 479s image gave a 4.7σ detection with a *u*-band magnitude of 20.84 ± 0.24 mag. A Canada-France-Hawaii Telescope Legacy Survey (CFHTLS; Cuillandre et al. 2012) catalogued source, 1139.121496, is found within 1.9 arcsec, consistent with the location of this source. The archival magnitude is $u = 27.34 \pm 1.25$ mag. The UVOT magnitude suggests the source has brightened by 6.5 magnitudes compared to the CFHTLS catalogue value (Hudelot et al. 2012) with the magnitudes inconsistent at 5.1σ . PTF and ZTF have observed this field, no source is detected in archival images.

Q1_src56 was found at a RA, Dec(J2000) = 41.89143, 5.44519 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence) in OBSID 07031068002 starting T0+5.5 days. The 712s image gave a 5.1σ detection with a *u*-band magnitude of 21.22 ± 0.22 mag. This source is not detected in the initial tiling of this field with a *u*-band exposure of 80s taken T0+1.2 days which gave a 3σ upper limit of > 20.54 mag. A SDSS catalogued source is found consistent with this location, J024733.94+052642.7, with an archival magnitude of $u = 22.51 \pm 0.30$ mag (Alam et al. 2015). This is inconsistent with the UVOT detection mag-

nitude at 3.5σ . The UVOT magnitude suggests the source has brightened by 1.3-1.8 magnitudes compared to the SDSS catalogue. This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q1_src58 was found at a RA, Dec(J2000) = 44.39037, 12.77930 deg with an estimated uncertainty of 1.0 arcsec (radius, 90 per cent confidence) in OBSID 07030716002 starting T0+3.6 days. The 486s image gave a 3.2σ detection with a *u*-band magnitude of 21.11 ± 0.34 mag. This source is not detected in the initial tiling of this field with two *u*-band exposures of 72s and 75s taken at T0+0.50 days and T0+0.83 days which give 3σ upper limits of > 20.08 mag and > 20.13 mag. A 476s exposure taken at T0+3.61 days, 9 minutes after the detection exposure with a 3σ upper limit of > 21.22 mag. Pan-STARRS, PTF and ZTF observed this field. The ZTF limiting magnitude, from stacked images taken between July 2018 and Nov 2018 are 22.32 and 22.13 mag, in the *g* and *r* bands respectively.

Q1_src62 was found at a RA, Dec(J2000) = 36.57361, -5.49852 deg with an estimated uncertainty of 1.1 arcsec (radius, 90 per cent confidence) in OBSID 07031053002 starting T0+3.9 days. The 469s image gave a 3.0σ detection with a *u*-band magnitude of 21.41 ± 0.37 mag. In an earlier image of similar duration taken at T0+3.2 days, this source is not detected down to a 3σ upper limit > 21.46 mag. A CFHTLS catalogued source, 1112.028886, is found consistent with the location of this source (Hudelot et al. 2012). The archival magnitude is $g = 27.04 \pm 0.65$ mag. This is inconsistent with the UVOT detection magnitude at 7.5σ and suggests the source has brightened by 5.6 magnitudes compared to the CFHTLS catalogue. A source was detected in stacked archival images in ZTF in the *r*-band only. The ZTF limiting magnitudes, from stacked images taken between July 2018 and Oct 2019, are 22.27, 21.11 and 21.51 mag in the *g*, *i* and *z* filters, respectively.

Q1_src78 was found at a RA, Dec(J2000) = 40.32801, -2.86688 deg with an estimated uncertainty of 0.7 arcsec (radius, 90 per cent confidence) in OBSID 07030669002 starting T0+2.1 days. The 490s image gave a 5.8σ detection with a *u*-band magnitude of 20.91 ± 0.19 mag. This source is not detected in 4 separate ~ 75 s exposures observed in a 2 hour window starting at T0+0.09 days. These exposures gave 3σ upper limits of > 20.5 mag. Another exposure taken 4.5hrs after the detection exposure gives a slightly fainter magnitude of $u = 21.34 \pm 0.27$ mag, which is consistent with the detection magnitude at 1.3σ . Two SDSS catalogue entries consistent with this location with the name J024118.73-025200.7 taken 52 days apart in 2008 (Alam et al. 2015). The archival magnitudes are $u = 22.40 \pm 0.30$ mag and $u = 22.11 \pm 0.22$ mag. The detection UVOT magnitude suggests the source has brightened by 1.1-1.5 magnitudes compared to the SDSS catalogue with the catalogue magnitudes inconsistent with the UVOT magnitude at 4.2σ and 4.1σ . This source is listed in several catalogues as a candidate AGN/quasar (Richards et al. 2015; Pâris et al. 2018; Flesch 2019; Liao et al. 2019). This is also listed in the catalogue of RR lyrae stars with a period of 0.50 days and a distance modulus of 20.05 mag (Stringer et al. 2019). The SDSS quasar catalogue gives a spectroscopic redshift for this object at $z = 0.920788$ (Pâris et al. 2018). This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

Q1_src106 was found at a RA, Dec(J2000) = 36.84194,-

2.89721 deg with an estimated uncertainty of 0.6 arcsec (radius, 90 per cent confidence) in OBSID 07031458002 starting T0+4.7 days. The 500s image gave a 6.7σ detection with a u -band magnitude of 20.73 ± 0.17 mag. A SDSS catalogued source, J022722.10-025350.3, is found consistent with the location of this source (Alam et al. 2015). The archival magnitude is $u = 21.63 \pm 0.15$ mag. The UVOT magnitude suggests the source has brightened by 0.9 magnitudes compared to the SDSS catalogue. The UVOT detection magnitude and the catalogue value are inconsistent at 3.9σ . A follow-up observation was performed in all filters with *Swift*/UVOT starting at T0+13.6 days, see Table S.1, the source was detected in the u and $uvw1$ filters only. The u -band magnitude is consistent with the first UVOT detection. This source is listed in several catalogues as a candidate AGN/quasar (Flesch 2015, 2016; Menzel et al. 2016; Liu et al. 2016). This is also listed in the catalogue of RR lyrae stars with a period of 0.48 days and a distance modulus of 20.83 mag (Stringer et al. 2019). A photometric redshift for this object is given as $z = 1.800$ based on SDSS photometry (Flesch 2015) and it is also found to be associated with an *XMM-Newton* X-ray source J022722.1-025350 with a flux $3.05 \pm 0.74 \times 10^{-15}$ erg cm $^{-2}$ s $^{-1}$ in the 0.2-12 keV energy range (Rosen et al. 2016; Flesch 2016, 2019; Webb et al. 2020). SIMBAD identifies this as 2XLSd J022722.0-025349, an X-ray source. This is morphologically classed as a star in SDSS DR12 (Alam et al. 2015).

S.1.13 S200213t

S2000213t was identified as a BNS (63 per cent) with a non-negligible chance of being terrestrial in origin (37 per cent; LIGO Scientific Collaboration & Virgo Collaboration 2020c). After manual inspection of the thumbnails, no sources were identified as interesting. However, *Swift* followed up two ZTF sources. ZTF20aamvmzj (AT2020cja; Kasliwal, ZTF Collaboration & GROWTH Collaboration 2020) and ZTF20aanakcd (AT2020cmr; Reusch et al. 2020), which we now discuss.

ZTF20aamvmzj (AT2020cja) was discovered at 58892.20 MJD, approximately 40 minutes after the GW trigger (58892.174 MJD) and was reported as hostless. A spectrum of this source showed it to have a blue continuum and a broad emission feature around 5600Å (Ho, Tzanidakis & Growth Collaboration 2020; De, ZTF Collaboration & Growth Collaboration 2020) and it was also observed photometrically by Lulin (Li, Kong & Growth Relay Of Observatories Watching Transients Happen (Growth) Collaboration 2020). *Swift*/UVOT observations began at T0+6.7 days and was detected in the u and UV filters. It was not detected initially in the v and b filters most likely due to a combination of short exposures and the faintness of this source. Follow-up observations showed this source to decay. By normalising all filters to the v -band, we measure a decay slope of -1.45 ± 0.23 . Kasliwal et al. (2020) report that this transient slowly faded over time with an $\alpha = 0.04$ in the r -band. No catalogued source is found consistent with the location of this source. The closest catalogued source, reported in the Pan-STARRS catalogue is 6'' away.

ZTF20aanakcd (AT2020cmr) was identified with an r -band magnitude of 20.59 ± 0.13 mag in ZTF observations beginning 0.4 hours after the trigger (Reusch et al. 2020).

ZTF20aanakcd was associated with a galaxy with an estimated photometric redshift of 0.05 (Reusch et al. 2020). This object was identified as a SN IIn at $z = 0.077$ through the identification of Balmer emission features in an optical spectrum (Andreoni et al. 2020). *Swift*/UVOT observations began 1.7 days after the GW trigger. Due to the identification as a SN before analysis of the UVOT data was performed it was decided a GCN was not required, however, we provide photometry here for completeness. Observations were only taken with the three UV filters. A source is observed at the location of ZTF20aanakcd in the $uvm2$ and $uvw2$ filters, but it is not clear if this is just an extension of the host galaxy or is light from the supernova. In Table S.1 we provide the photometry at the location of ZTF20aanakcd. We have not subtracted the host galaxy from these magnitudes.

S.1.14 S200224ca

S200224ca (LIGO Scientific Collaboration & Virgo Collaboration 2020d) was identified as a BBH (> 99 per cent). Manual inspection identified 1 Q0 source and 2 Q1 sources as sources of interest.

Q0_src47 was found at RA, Dec(J2000) = 176.58794, -11.46508 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence), in an image with OBSID 07031750001, observed starting at T0+0.74 days with a 75s exposure. The initial u -band magnitude was $u = 19.64 \pm 0.23$, giving a 4.8σ detection. This source was announced to the community via Breeveld et al. (2020). No follow-up was reported by other facilities. The source was not detected in any filter in a second UVOT visit starting T0+3.2 days, which indicates the source had faded by $\gtrsim 1$ mag, see Table S.1. A further follow-up observation was performed 4 months after the GW trigger providing a 3σ upper limit of > 20.89 in the u -band, indicating the source had faded by > 2.3 magnitudes. In the Pan-STARRS catalogue a source is found at a position consistent with Q0_src47. The source in Pan-STARRS is point-like and very red. The stacked Pan-STARRS images give a g -band magnitude of 24.97 ± 0.92 . The difference between this and the UVOT detection is 5.3 magnitudes and they are inconsistent at 5σ . ZTF also observed this field, nothing is seen at the location of this source.

Q1_src40 was found at a RA, Dec(J2000) = 173.27717, -2.44852 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence), in OBSID 07032202001 starting T0+2.1 days. The 75s image gave a 3.3σ detection with a u -band magnitude of 20.44 ± 0.34 mag. A second longer UVOT u band image (258s) gave a 5.6σ detection with a u -band magnitude of 20.54 ± 0.20 mag taken at T0+10.5 days. A SDSS DR12 catalogued source, J113306.49-022654.8, is found consistent with the location of this source (Alam et al. 2015). The archival magnitude is $u = 21.17 \pm 0.08$ mag. The difference between this value and the two UVOT magnitudes suggests the source has brightened by ~ 0.7 magnitudes compared to the SDSS catalogue at the 2.3σ and 3σ level, respectively. This source is listed in several catalogues as a candidate AGN/quasar (Suchkov, Hanisch & Margon 2005; Brescia, Cavuoti & Longo 2015; Nakoneczny et al. 2019). A couple of sources give photometric redshifts: $z_{phot} = 0.5042 \pm 0.1879$ and $z = 0.0486$ based on SDSS photometry (Alam et al. 2015; Delli Veneri et al. 2019); a lower

and upper redshift limit of 0.20, 0.60 was also derived using SDSS photometry (Suchkov, Hanisch & Margon 2005); $z = 0.28$ based on VISTA and VLT photometry (Wright et al. 2019). This is morphologically classed as a galaxy in SDSS DR12 (Alam et al. 2015).

Q1_src54 was identified at a RA, Dec(J2000) = 173.30543, -2.46977 deg with an estimated uncertainty of 0.8 arcsec (radius, 90 per cent confidence), in OBSID 07032202001 starting T0+2.1 days. The 75s image gave a 3.4σ detection with a u -band magnitude of 20.06 ± 0.32 mag. The source was not detected in a second longer UVOT u -band image (258s) with a 3σ upper limit of > 20.96 mag taken at T0+10.5 days suggesting the source faded between observations. No catalogued source is found consistent with the location of this source. The closest catalogued optical source is $6''$ away in the SDSS DR12 (Alam et al. 2015), although there is a FIR source $4''$ away reported in the unWISE catalogue (Schlafly, Meisner & Green 2019). Pan-STARRS and ZTF observed this field, no source is found within the archival image. In ZTF the stacked g and r images give upper limits of > 21.33 and > 21.45 mag, these stacks were created using images taken between Feb 2018 and Dec 2018.

Table S.1: Table of follow-up observations. Magnitudes are given in AB and have not been corrected for Galactic extinction.

^a These magnitudes have been host subtracted.

GW trigger	Candidate	Start Time (UT)	Filter	Exposure (s)	Magnitude (AB)
S190412m	Q0_src10	2019-04-12T19:31:45	<i>u</i>	79	20.32 ± 0.28
S190412m	Q0_src10	2020-06-26T12:03:44	<i>u</i>	543	20.47 ± 0.12
S190412m	Q0_src28	2019-04-12T17:48:36	<i>u</i>	75	20.16 ± 0.28
S190412m	Q0_src28	2020-06-30T08:38:30	<i>u</i>	438	20.40 ± 0.15
S190412m	Q0_src36	2019-04-12T21:33:49	<i>u</i>	77	20.01 ± 0.24
S190412m	Q0_src36	2020-06-27T00:42:09	<i>u</i>	518	20.32 ± 0.12
S190425z	Q0_src136	2019-04-25T19:10:41	<i>u</i>	73	19.39 ± 0.32
S190425z	Q0_src136	2020-06-17T15:31:58	<i>u</i>	352	> 20.31
S190425z	Q0_src186	2018-10-20T12:05:47	<i>u</i>	185	> 20.24
S190425z	Q0_src186	2018-10-20T12:03:33	<i>uvw1</i>	128	> 20.36
S190425z	Q0_src186	2018-10-21T08:48:45	<i>u</i>	461	> 20.73
S190425z	Q0_src186	2018-10-21T08:44:43	<i>uvw1</i>	390	> 21.07
S190425z	Q0_src186	2019-04-26T18:49:22	<i>u</i>	67	18.74 ± 0.18
S190425z	Q0_src186	2019-04-27T21:48:07	<i>v</i>	79	> 18.46
S190425z	Q0_src186	2019-04-27T21:41:17	<i>b</i>	79	> 19.35
S190425z	Q0_src186	2019-04-27T21:39:53	<i>u</i>	79	> 20.16
S190425z	Q0_src186	2019-04-27T21:37:09	<i>uvw1</i>	157	> 20.78
S190425z	Q0_src186	2019-04-27T21:49:30	<i>uvm2</i>	438	> 21.43
S190425z	Q0_src186	2019-04-27T21:42:42	<i>uvw2</i>	315	> 21.55
S190425z	ZTF19aarykbb	2019-04-25T18:39:33	<i>v</i>	79	18.41 ± 0.27
S190425z	ZTF19aarykbb	2019-04-25T18:32:43	<i>b</i>	79	18.87 ± 0.19
S190425z	ZTF19aarykbb	2019-04-25T18:31:19	<i>u</i>	79	19.43 ± 0.18
S190425z	ZTF19aarykbb	2019-04-25T18:28:35	<i>uvw1</i>	157	20.73 ± 0.29
S190425z	ZTF19aarykbb	2019-04-25T18:40:58	<i>uvm2</i>	739	22.16 ± 0.36
S190425z	ZTF19aarykbb	2019-04-25T18:34:09	<i>uvw2</i>	315	> 21.92
S190425z	ZTF19aarykbb	2019-04-25T23:29:21	<i>v</i>	79	18.00 ± 0.21
S190425z	ZTF19aarykbb	2019-04-25T23:22:30	<i>b</i>	79	18.47 ± 0.15
S190425z	ZTF19aarykbb	2019-04-25T23:21:06	<i>u</i>	79	19.68 ± 0.22
S190425z	ZTF19aarykbb	2019-04-25T23:18:20	<i>uvw1</i>	157	20.66 ± 0.28
S190425z	ZTF19aarzaod	2019-04-26T02:37:36	<i>u</i>	1249	21.67 ± 0.29
S190425z	ZTF19aarzaod	2019-04-26T02:15:29	<i>uvw1</i>	1683	> 22.72
S190425z	AT2019ebq	2019-04-26T15:20:49	<i>u</i>	676	20.25 ± 0.14
S190425z	AT2019ebq	2019-04-26T14:59:02	<i>uvw1</i>	1280	21.69 ± 0.29
S190426c	ZTF19aassfws	2019-05-16T00:58:39	<i>v</i>	357	19.03 ± 0.20
S190426c	ZTF19aassfws	2019-05-16T00:51:30	<i>b</i>	357	19.70 ± 0.15
S190426c	ZTF19aassfws	2019-05-16T00:50:02	<i>u</i>	357	20.71 ± 0.18
S190426c	ZTF19aassfws	2019-05-16T00:47:11	<i>uvw1</i>	715	> 22.21
S190426c	ZTF19aassfws	2019-05-16T01:00:07	<i>uvm2</i>	1098	21.75 ± 0.22
S190426c	ZTF19aassfws	2019-05-16T00:53:00	<i>uvw2</i>	1432	21.77 ± 0.17
S190510g	Cand-A09	2019-05-10T10:59:50	<i>u</i>	62	17.11 ± 0.07
S190510g	Cand-A09	2021-04-21T13:52:49	<i>u</i>	478	> 21.78
S190718y	Q1_src82	2019-07-18T19:21:03	<i>u</i>	80	> 19.57
S190718y	Q1_src82	2019-07-22T18:46:24	<i>u</i>	478	20.40 ± 0.16
S190718y	Q1_src82	2020-06-26T21:59:00	<i>u</i>	822	20.52 ± 0.12
S190728q	ZTF19abjethn	2019-07-28T19:23:17	<i>v</i>	79	16.62 ± 0.09
S190728q	ZTF19abjethn	2019-07-28T21:06:50	<i>v</i>	79	16.13 ± 0.08
S190728q	ZTF19abjethn	2019-07-28T22:50:40	<i>v</i>	79	16.00 ± 0.07
S190728q	ZTF19abjethn	2019-07-28T19:16:27	<i>b</i>	79	16.44 ± 0.05
S190728q	ZTF19abjethn	2019-07-28T21:00:00	<i>b</i>	79	16.15 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T22:43:51	<i>b</i>	79	15.96 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T19:15:03	<i>u</i>	79	17.07 ± 0.05
S190728q	ZTF19abjethn	2019-07-28T20:58:36	<i>u</i>	78	16.54 ± 0.05
S190728q	ZTF19abjethn	2019-07-28T22:42:27	<i>u</i>	79	16.34 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T19:12:19	<i>uvw1</i>	157	17.36 ± 0.05
S190728q	ZTF19abjethn	2019-07-28T20:55:51	<i>uvw1</i>	157	16.98 ± 0.05
S190728q	ZTF19abjethn	2019-07-28T22:39:42	<i>uvw1</i>	157	16.59 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T19:24:40	<i>uvm2</i>	147	17.69 ± 0.07
S190728q	ZTF19abjethn	2019-07-28T21:08:15	<i>uvm2</i>	245	17.05 ± 0.05

S190728q	ZTF19abjethn	2019-07-28T22:52:04	<i>uvm2</i>	235	16.75 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T19:17:52	<i>uvw2</i>	315	17.68 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T21:01:26	<i>uvw2</i>	315	17.13 ± 0.04
S190728q	ZTF19abjethn	2019-07-28T22:45:16	<i>uvw2</i>	315	16.77 ± 0.03
S190814bv	AT2019osy	2019-08-27T17:05:30	<i>u</i>	1949	> 22.47
S190814bv	AT2019osy	2019-08-28T02:09:31	<i>u</i>	2717	22.76 ± 0.33
S190814bv	Q1_src5	2019-08-15T00:34:18	<i>u</i>	39	> 20.14
S190814bv	Q1_src5	2019-08-15T17:54:46	<i>u</i>	78	> 20.64
S190814bv	Q1_src5	2019-08-16T06:39:35	<i>u</i>	73	> 20.56
S190814bv	Q1_src5	2019-08-18T12:56:25	<i>u</i>	503	20.69 ± 0.16
S190814bv	Q1_src5	2020-06-29T09:21:21	<i>u</i>	507	20.77 ± 0.20
S190814bv	Q1_src49	2019-08-15T08:37:11	<i>u</i>	78	> 20.64
S190814bv	Q1_src49	2019-08-16T04:53:15	<i>u</i>	65	> 20.55
S190814bv	Q1_src49	2019-08-19T09:31:47	<i>u</i>	480	21.11 ± 0.21
S190814bv	Q1_src49	2020-06-30T08:56:03	<i>u</i>	465	21.53 ± 0.29
S190814bv	Q1_src54	2010-11-13T10:17:06	<i>b</i>	95	> 20.15
S190814bv	Q1_src54	2010-11-13T10:27:03	<i>uvm2</i>	232	21.37 ± 0.32
S190814bv	Q1_src54	2010-11-13T10:15:25	<i>u</i>	95	> 20.86
S190814bv	Q1_src54	2010-11-13T10:25:22	<i>v</i>	95	> 19.21
S190814bv	Q1_src54	2010-11-13T10:12:06	<i>uvw1</i>	191	21.35 ± 0.32
S190814bv	Q1_src54	2010-11-13T10:18:49	<i>uvw2</i>	382	21.45 ± 0.21
S190814bv	Q1_src54	2019-08-15T10:05:02	<i>u</i>	79	> 20.70
S190814bv	Q1_src54	2019-08-18T19:19:25	<i>u</i>	503	21.46 ± 0.26
S190814bv	Q1_src54	2019-08-28T08:36:33	<i>u</i>	967	21.33 ± 0.17
S190814bv	Q1_src113	2019-08-15T02:02:55	<i>u</i>	261	21.10 ± 0.28
S190814bv	Q1_src113	2019-08-15T03:46:09	<i>u</i>	70	> 20.57
S190814bv	Q1_src113	2019-08-16T02:08:50	<i>u</i>	80	> 20.68
S190814bv	Q1_src113	2019-08-18T03:24:42	<i>u</i>	545	21.04 ± 0.19
S190814bv	Q1_src113	2019-08-23T02:44:37	<i>u</i>	963	20.96 ± 0.13
S190930t	Q1_src33	2019-10-01T04:56:20	<i>u</i>	69	19.14 ± 0.33
S190930t	Q1_src33	2019-10-01T11:18:21	<i>u</i>	70	> 19.35
S190930t	Q1_src33	2020-06-28T02:16:09	<i>u</i>	282	> 20.75
S190930t	Q0_src93	2019-09-30T18:33:40	<i>u</i>	74	19.48 ± 0.20
S190930t	Q0_src93	2019-10-02T16:17:18	<i>u</i>	79	19.67 ± 0.22
S190930t	AT2019sbk	2019-10-01T07:19:41	<i>u</i>	75	19.84 ± 0.22
S190930t	AT2019sbk	2019-10-04T05:09:24	<i>v</i>	157	18.81 ± 0.22
S190930t	AT2019sbk	2019-10-04T05:02:33	<i>b</i>	157	19.43 ± 0.18
S190930t	AT2019sbk	2019-10-04T05:01:09	<i>u</i>	157	20.67 ± 0.25
S190930t	AT2019sbk	2019-10-04T04:58:24	<i>uvw1</i>	315	21.43 ± 0.29
S190930t	AT2019sbk	2019-10-04T05:10:49	<i>uvm2</i>	496	21.23 ± 0.23
S190930t	AT2019sbk	2019-10-04T05:04:00	<i>uvw2</i>	629	21.37 ± 0.18
S190930t	AT2019sbk	2019-10-07T08:15:45	<i>v</i>	236	18.93 ± 0.19
S190930t	AT2019sbk	2019-10-07T07:41:38	<i>b</i>	393	19.64 ± 0.15
S190930t	AT2019sbk	2019-10-07T07:40:13	<i>u</i>	393	20.76 ± 0.22
S190930t	AT2019sbk	2019-10-07T07:37:29	<i>uvw1</i>	786	21.14 ± 0.17
S190930t	AT2019sbk	2019-10-07T08:17:09	<i>uvm2</i>	773	21.77 ± 0.24
S190930t	AT2019sbk	2019-10-07T07:43:03	<i>uvw2</i>	1226	21.47 ± 0.15
S190930t	AT2019sbk	2019-10-07T15:58:58	<i>u</i>	2712	20.48 ± 0.07
S190930t	AT2019sbk	2019-10-09T07:33:31	<i>b</i>	256	19.90 ± 0.21
S190930t	AT2019sbk	2019-10-09T07:42:32	<i>uvm2</i>	782	21.58 ± 0.22
S190930t	AT2019sbk	2019-10-09T07:31:58	<i>u</i>	256	20.61 ± 0.23
S190930t	AT2019sbk	2019-10-09T07:41:00	<i>v</i>	256	18.93 ± 0.19
S190930t	AT2019sbk	2019-10-09T07:28:59	<i>uvw1</i>	511	21.14 ± 0.22
S190930t	AT2019sbk	2019-10-09T07:35:04	<i>uvw2</i>	1025	21.47 ± 0.16
S190930t	AT2019sbk	2019-10-11T09:04:47	<i>b</i>	143	19.78 ± 0.23
S190930t	AT2019sbk	2019-10-11T09:08:43	<i>uvm2</i>	498	21.27 ± 0.23
S190930t	AT2019sbk	2019-10-11T09:04:06	<i>u</i>	143	20.56 ± 0.25
S190930t	AT2019sbk	2019-10-11T09:08:02	<i>v</i>	143	19.23 ± 0.30
S190930t	AT2019sbk	2019-10-11T05:56:23	<i>uvw1</i>	408	21.22 ± 0.22
S190930t	AT2019sbk	2019-10-11T09:05:29	<i>uvw2</i>	575	21.58 ± 0.21
S190930t	AT2019sbk	2019-10-01T07:19:41	<i>u</i>	75	$> 19.70^a$
S190930t	AT2019sbk	2019-10-04T05:09:24	<i>v</i>	157	$> 18.94^a$

S190930t	AT2019sbk	2019-10-04T05:02:33	<i>b</i>	157	$> 19.56^a$
S190930t	AT2019sbk	2019-10-04T05:01:09	<i>u</i>	157	$> 20.94^a$
S190930t	AT2019sbk	2019-10-04T04:58:24	<i>uvw1</i>	315	$> 21.82^a$
S190930t	AT2019sbk	2019-10-04T05:10:49	<i>uvm2</i>	496	$> 21.36^a$
S190930t	AT2019sbk	2019-10-04T05:04:00	<i>uvw2</i>	629	$> 21.75^a$
S190930t	AT2019sbk	2019-10-07T08:15:45	<i>v</i>	236	$> 19.23^a$
S190930t	AT2019sbk	2019-10-07T07:41:38	<i>b</i>	393	$> 20.00^a$
S190930t	AT2019sbk	2019-10-07T07:40:13	<i>u</i>	393	$> 21.22^a$
S190930t	AT2019sbk	2019-10-07T07:37:29	<i>uvw1</i>	786	$> 21.58^a$
S190930t	AT2019sbk	2019-10-07T08:17:09	<i>uvm2</i>	773	$> 22.43^a$
S190930t	AT2019sbk	2019-10-07T07:43:03	<i>uvw2</i>	1226	$> 22.10^a$
S190930t	AT2019sbk	2019-10-07T15:58:58	<i>u</i>	2712	$> 21.10^a$
S190930t	ZTF19acbpqlh	2017-02-28T17:14:27	<i>u</i>	59	> 20.08
S190930t	ZTF19acbpqlh	2019-10-02T00:46:00	<i>u</i>	1943	20.39 ± 0.09
S191213g	PS19hgw	2017-08-30T14:51:32	<i>u</i>	496	19.69 ± 0.09
S191213g	PS19hgw	2019-12-18T20:28:20	<i>v</i>	157	18.71 ± 0.35^a
S191213g	PS19hgw	2019-12-18T20:21:30	<i>b</i>	157	19.38 ± 0.34^a
S191213g	PS19hgw	2019-12-18T20:20:05	<i>u</i>	157	19.52 ± 0.23^a
S191213g	PS19hgw	2019-12-18T20:17:21	<i>uvw1</i>	314	20.17 ± 0.24^a
S191213g	PS19hgw	2019-12-18T20:29:44	<i>uvm2</i>	1163	21.16 ± 0.28^a
S191213g	PS19hgw	2019-12-18T20:22:55	<i>uvw2</i>	629	20.65 ± 0.21^a
S191213g	ZTF19acykzsk	2019-12-14T20:50:27	<i>v</i>	315	$> 19.74^a$
S191213g	ZTF19acykzsk	2019-12-14T20:36:57	<i>b</i>	157	$> 20.11^a$
S191213g	ZTF19acykzsk	2019-12-14T20:34:12	<i>u</i>	157	19.61 ± 0.28^a
S191213g	ZTF19acykzsk	2019-12-14T20:28:48	<i>uvw1</i>	315	20.00 ± 0.17^a
S191213g	ZTF19acykzsk	2019-12-14T20:55:52	<i>uvm2</i>	437	21.26 ± 0.33^a
S191213g	ZTF19acykzsk	2019-12-14T20:39:42	<i>uvw2</i>	630	21.19 ± 0.22^a
S191213g	ZTF19acyldun	2019-12-15T22:36:01	<i>v</i>	315	$> 18.79^a$
S191213g	ZTF19acyldun	2019-12-15T22:22:30	<i>b</i>	157	19.51 ± 0.32^a
S191213g	ZTF19acyldun	2019-12-15T22:19:45	<i>u</i>	157	19.40 ± 0.14^a
S191213g	ZTF19acyldun	2019-12-15T22:14:21	<i>uvw1</i>	315	19.30 ± 0.12^a
S191213g	ZTF19acyldun	2019-12-15T22:41:25	<i>uvm2</i>	416	19.60 ± 0.14^a
S191213g	ZTF19acyldun	2019-12-15T22:25:15	<i>uvw2</i>	630	20.01 ± 0.13^a
S191213g	ZTF19acymixu	2019-08-12T07:20:46	<i>uvw1</i>	1537	> 22.50
S191213g	ZTF19acymixu	2019-08-26T18:50:37	<i>uvw2</i>	609	> 22.34
S191213g	ZTF19acymixu	2019-10-02T16:56:21	<i>uvm2</i>	683	> 22.25
S191213g	ZTF19acymixu	2019-11-17T17:23:47	<i>u</i>	776	> 22.13
S191213g	ZTF19acymixu	2019-12-15T20:58:10	<i>v</i>	315	19.71 ± 0.31
S191213g	ZTF19acymixu	2019-12-15T20:44:40	<i>b</i>	157	20.03 ± 0.29
S191213g	ZTF19acymixu	2019-12-15T20:41:55	<i>u</i>	157	> 21.09
S191216ap	Q0_src147	2019-12-17T07:36:17	<i>u</i>	53	17.35 ± 0.08
(CSS151110:212806+023221)					
S200114f	Q0_src201	2020-01-15T00:40:22	<i>u</i>	68	17.86 ± 0.09
MASTER OT J071845.44+194439.4					
S200115j	Q1_src1	2020-01-15T19:41:48	<i>u</i>	76	> 20.44
S200115j	Q1_src1	2020-01-15T21:10:34	<i>u</i>	75	20.30 ± 0.32
S200115j	Q1_src1	2020-01-16T03:18:04	<i>u</i>	50	> 20.14
S200115j	Q1_src1	2020-01-16T03:40:43	<i>u</i>	76	> 20.49
S200115j	Q1_src1	2020-06-30T19:01:07	<i>u</i>	875	> 21.40
S200115j	Q1_src12	2020-01-15T11:11:27	<i>u</i>	79	> 20.39
S200115j	Q1_src12	2020-01-16T22:10:05	<i>u</i>	74	> 20.06
S200115j	Q1_src12	2020-01-17T22:21:37	<i>u</i>	493	20.81 ± 0.18
S200115j	Q1_src12	2020-01-19T09:07:20	<i>u</i>	507	20.62 ± 0.20
S200115j	Q1_src20	2020-01-15T11:09:41	<i>u</i>	80	> 20.34
S200115j	Q1_src20	2020-01-17T10:54:16	<i>u</i>	536	20.66 ± 0.19
S200115j	Q1_src20	2020-06-26T01:35:22	<i>u</i>	446	21.34 ± 0.34
S200115j	Q1_src28	2020-01-16T11:03:03	<i>u</i>	74	> 20.13
S200115j	Q1_src28	2020-01-19T22:10:27	<i>u</i>	501	21.01 ± 0.20
S200115j	Q1_src28	2020-01-28T06:57:47	<i>b</i>	231	> 20.46
S200115j	Q1_src28	2020-01-28T07:11:29	<i>uvm2</i>	681	22.19 ± 0.34
S200115j	Q1_src28	2020-01-28T06:55:28	<i>u</i>	231	20.95 ± 0.30
S200115j	Q1_src28	2020-01-28T07:09:10	<i>v</i>	231	> 19.57

S200115j	Q1_src28	2020-01-28T06:50:55	<i>uvw1</i>	464	21.77 ± 0.32
S200115j	Q1_src28	2020-01-28T07:00:07	<i>uvw2</i>	928	22.26 ± 0.26
S200115j	Q1_src28	2020-02-09T03:57:22	<i>u</i>	505	20.89 ± 0.23
S200115j	Q1_src39	2020-01-15T09:32:05	<i>u</i>	15	> 18.99
S200115j	Q1_src39	2020-01-16T07:52:10	<i>u</i>	63	> 20.11
S200115j	Q1_src39	2020-01-17T06:08:59	<i>u</i>	434	> 21.38
S200115j	Q1_src39	2020-01-17T03:00:39	<i>u</i>	79	> 20.31
S200115j	Q1_src39	2020-01-18T07:46:47	<i>u</i>	491	> 21.74
S200115j	Q1_src39	2020-01-19T04:20:49	<i>u</i>	479	20.84 ± 0.24
S200115j	Q1_src39	2020-06-29T04:28:02	<i>u</i>	342	> 21.40
S200115j	Q1_src56	2020-01-16T08:27:43	<i>u</i>	80	> 20.54
S200115j	Q1_src56	2020-01-20T17:06:52	<i>u</i>	712	21.22 ± 0.22
S200115j	Q1_src56	2020-06-26T01:43:47	<i>u</i>	738	> 21.46
S200115j	Q1_src58	2020-01-15T16:23:09	<i>u</i>	72	> 20.08
S200115j	Q1_src58	2020-01-16T00:23:06	<i>u</i>	75	> 20.13
S200115j	Q1_src58	2020-01-18T19:02:07	<i>u</i>	486	21.11 ± 0.34
S200115j	Q1_src58	2020-01-18T19:11:02	<i>u</i>	476	> 21.22
S200115j	Q1_src62	2020-01-18T09:14:05	<i>u</i>	487	> 21.46
S200115j	Q1_src62	2020-01-19T01:09:59	<i>u</i>	469	21.41 ± 0.37
S200115j	Q1_src62	2020-06-29T18:51:36	<i>u</i>	550	> 21.59
S200115j	Q1_src78	2020-01-15T06:29:33	<i>u</i>	75	> 20.51
S200115j	Q1_src78	2020-01-15T06:54:51	<i>u</i>	78	> 20.58
S200115j	Q1_src78	2020-01-15T08:31:37	<i>u</i>	75	> 20.54
S200115j	Q1_src78	2020-01-15T08:33:22	<i>u</i>	75	> 20.54
S200115j	Q1_src78	2020-01-17T06:25:52	<i>u</i>	490	20.91 ± 0.19
S200115j	Q1_src78	2020-01-17T11:03:59	<i>u</i>	489	21.34 ± 0.27
S200115j	Q1_src78	2020-06-30T20:37:53	<i>u</i>	475	> 21.33
S200115j	Q1_src106	2020-01-19T20:34:28	<i>u</i>	499	20.73 ± 0.17
S200115j	Q1_src106	2020-01-28T19:53:38	<i>v</i>	227	> 19.54
S200115j	Q1_src106	2020-01-28T19:41:57	<i>b</i>	227	> 20.41
S200115j	Q1_src106	2020-01-28T19:39:35	<i>u</i>	227	20.79 ± 0.27
S200115j	Q1_src106	2020-01-28T19:34:55	<i>uvw1</i>	455	21.73 ± 0.32
S200115j	Q1_src106	2020-01-28T19:56:00	<i>uvm2</i>	684	> 22.35
S200115j	Q1_src106	2020-01-28T19:44:21	<i>uvw2</i>	910	> 22.81
S200213t	ZTF20aamvmzj	2020-02-19T20:32:13	<i>v</i>	228	> 19.15
S200213t	ZTF20aamvmzj	2020-02-19T20:25:22	<i>b</i>	236	> 19.79
S200213t	ZTF20aamvmzj	2020-02-19T20:23:57	<i>u</i>	236	20.08 ± 0.27
S200213t	ZTF20aamvmzj	2020-02-19T20:33:37	<i>uvm2</i>	753	21.79 ± 0.30
S200213t	ZTF20aamvmzj	2020-02-19T20:21:13	<i>uvw1</i>	472	21.42 ± 0.36
S200213t	ZTF20aamvmzj	2020-02-19T20:26:47	<i>uvw2</i>	944	21.73 ± 0.24
S200213t	ZTF20aamvmzj	2020-02-23T01:22:41	<i>v</i>	204	> 19.39
S200213t	ZTF20aamvmzj	2020-02-23T01:16:59	<i>b</i>	204	> 19.99
S200213t	ZTF20aamvmzj	2020-02-23T01:15:48	<i>u</i>	204	20.56 ± 0.34
S200213t	ZTF20aamvmzj	2020-02-23T01:13:30	<i>uvw1</i>	411	> 21.45
S200213t	ZTF20aamvmzj	2020-02-23T01:23:51	<i>uvm2</i>	757	21.79 ± 0.30
S200213t	ZTF20aamvmzj	2020-02-23T01:18:11	<i>uvw2</i>	822	> 22.30
S200213t	ZTF20aamvmzj	2020-02-26T09:04:46	<i>v</i>	235	> 19.55
S200213t	ZTF20aamvmzj	2020-02-26T08:54:49	<i>b</i>	235	> 20.01
S200213t	ZTF20aamvmzj	2020-02-26T08:52:48	<i>u</i>	235	20.52 ± 0.31
S200213t	ZTF20aamvmzj	2020-02-26T08:48:48	<i>uvw1</i>	471	> 21.54
S200213t	ZTF20aamvmzj	2020-02-26T09:06:47	<i>uvm2</i>	369	> 21.59
S200213t	ZTF20aamvmzj	2020-02-26T08:56:52	<i>uvw2</i>	942	> 22.42
S200213t	ZTF20aamvmzj	2020-03-04T00:26:47	<i>v</i>	108	> 19.04
S200213t	ZTF20aamvmzj	2020-03-04T00:17:25	<i>b</i>	241	> 20.23
S200213t	ZTF20aamvmzj	2020-03-04T00:15:31	<i>u</i>	241	> 20.92
S200213t	ZTF20aamvmzj	2020-03-04T00:11:46	<i>uvw1</i>	482	> 21.64
S200213t	ZTF20aamvmzj	2020-03-04T00:28:41	<i>uvm2</i>	310	> 21.41
S200213t	ZTF20aamvmzj	2020-03-04T00:19:21	<i>uvw2</i>	641	> 22.18
S200213t	ZTF20aamvmzj	2020-03-13T01:08:58	<i>v</i>	320	> 19.63
S200213t	ZTF20aamvmzj	2020-03-13T00:57:48	<i>b</i>	320	> 20.38
S200213t	ZTF20aamvmzj	2020-03-13T00:55:30	<i>u</i>	320	> 21.05
S200213t	ZTF20aamvmzj	2020-03-13T00:51:02	<i>uvw1</i>	641	> 21.83

S200213t	ZTF20aamvmzj	2020-03-13T01:11:14	<i>uvm2</i>	928	> 22.22
S200213t	ZTF20aamvmzj	2020-03-13T01:00:05	<i>uvw2</i>	1283	> 22.64
S200213t	ZTF20aanakcd	2020-02-14T22:45:59	<i>uvw1</i>	232	20.05 ± 0.18
S200213t	ZTF20aanakcd	2020-02-14T21:06:55	<i>uvm2</i>	917	20.49 ± 0.12
S200213t	ZTF20aanakcd	2020-02-14T20:58:29	<i>uvw2</i>	1767	20.53 ± 0.08
S200224ca	Q0_src47	2020-02-25T16:05:25	<i>u</i>	75	19.64 ± 0.23
S200224ca	Q0_src47	2020-02-28T02:44:02	<i>v</i>	334	> 19.90
S200224ca	Q0_src47	2020-02-28T02:48:35	<i>b</i>	122	> 20.18
S200224ca	Q0_src47	2020-02-28T02:47:27	<i>u</i>	143	> 21.00
S200224ca	Q0_src47	2020-02-28T02:46:19	<i>uvw1</i>	307	> 21.75
S200224ca	Q0_src47	2020-02-28T02:45:10	<i>uvm2</i>	333	> 21.77
S200224ca	Q0_src47	2020-02-28T02:42:54	<i>uvw2</i>	333	> 22.09
S200224ac	Q0_src47	2020-06-30T11:43:09	<i>u</i>	755	> 21.91
S200224ca	Q1_src40	2020-02-27T01:34:56	<i>u</i>	75	20.44 ± 0.34
S200224ca	Q1_src40	2020-03-06T11:31:33	<i>u</i>	258	20.54 ± 0.20
S200224ca	Q1_src54	2020-02-27T01:34:56	<i>u</i>	75	20.06 ± 0.32
S200224ac	Q1_src54	2020-03-06T11:31:33	<i>u</i>	258	> 20.96
S200224ac	Q1_src54	2020-06-29T10:09:35	<i>u</i>	905	> 21.46

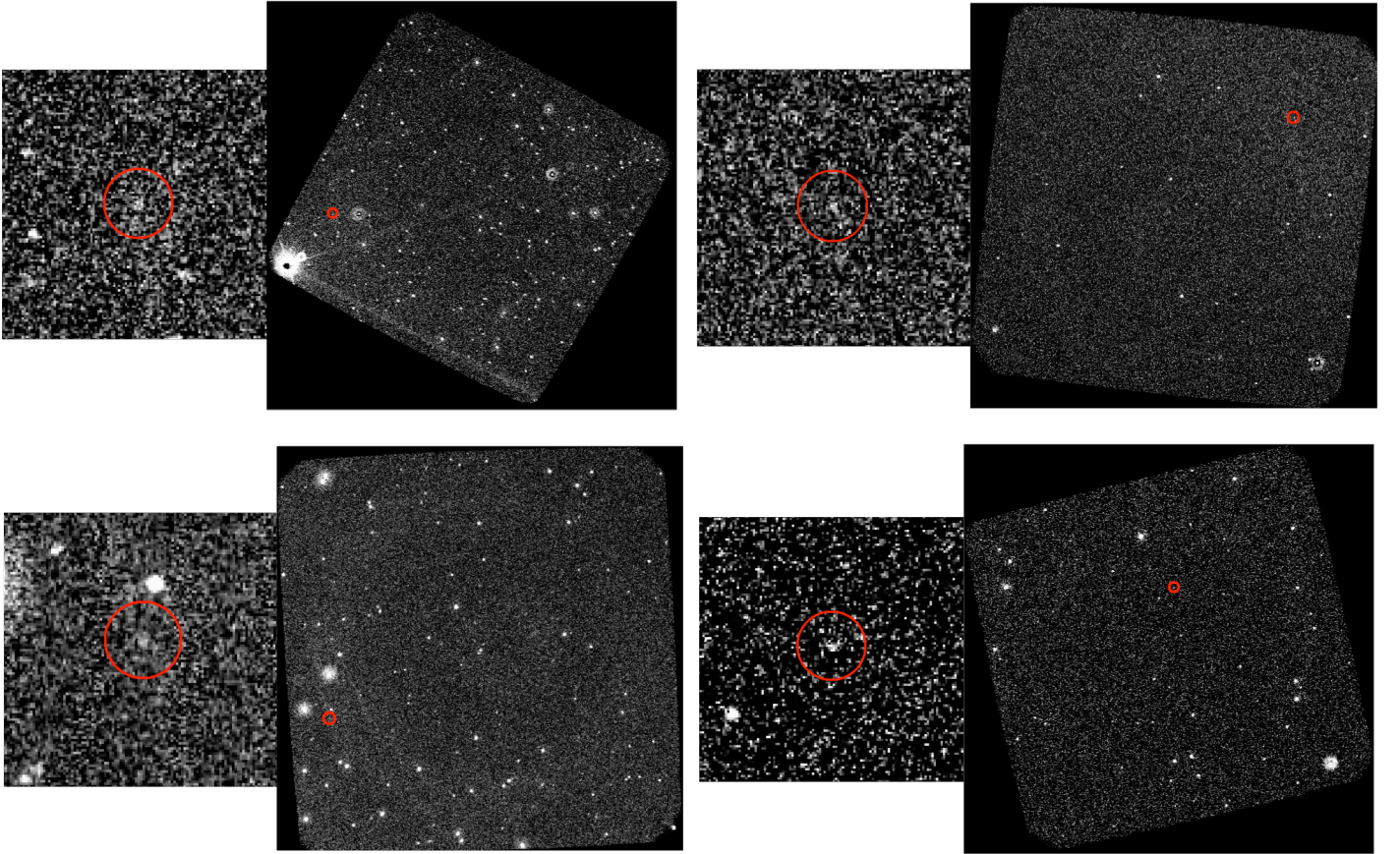


Figure S.8. Figure displays the full frame UVOT image for each source of interest that does not have a catalogued counterpart as well as a zoom in on the UVOT source: Q0_src136 (S190425z; top left), Q1_src33 (S190930t; top right), Q1_src58 (S200115j; bottom left) and Q1_src54 (S200224ca; bottom right). A red circle of 15 arc sec radius encompasses the source location in all images.

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