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# Liverpool Telescope classification of optical transients

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We conducted spectroscopic observations of seven Local Group nova candidates using the SPRAT instrument (Piascik et al. 2014) on the 2m-robotic Liverpool Telescope (LT; Steele et al. 2004). Each spectral observation is preceded by a series of (typically at least 3) 10s acquisition images taken either by SPRAT (unfiltered) or IO:O through a Sloan-r' filter. Each spectrum consists of 3×600s or 3×900s exposure time using the blue-optimised mode of SPRAT.

We attempted to obtain a spectrum of AT2018hfs on 2018-10-15.97 UT, but the object is barely visible in the acquisition images. AT2018gqg and AT2018had were observed at 2018-09-22.95 and 2018-10-04.12 UT respectively. A faint continuum is detected in each case, but the S/N is too low for a classification. AT2018hho was observed at 2018-10-16.94 UT. We detect a Hα emission line with FWHM ~ 3100 km/s. A spectrum of AT2018hcd taken 2018-10-16.98 UT shows a red continuum. The S/N is low, but there is tentative evidence for TiO absorption bands, indicating the transient is likely a red LPV.

We obtained a spectrum of AT2018hhy at 2018-10-17.99 UT, which shows TiO absorption bands on a red continuum, indicating that this object is a red LPV. We also note that there is a variable coincident with the position of AT2018hhy in Macri et al. (2001) and Hartman et al. (2006).

We obtained a spectrum of AT2018hld at 2018-10-18.89 UT. The spectrum shows strong Balmer emission and we measure the Hα FWHM ~ 2300 km/s. The spectrum also shows numerous Fe II emission lines, including those of the 42, 48, 49 and 74 multiplets, along will O I 7774 Å (the latter of which seems to show a P-Cygni profile). The spectrum confirms AT2018hld is a nova in M31 and a member of the Fe II spectroscopic class. The spectrum is also broadly similar with that obtained around one day earlier by Robin Leadbeater (see AT2018hld TNS page).

The objects that we were able to classify are summarised below:

| Nova candidate | Date (UT) | Classification |
|---|---|---|
| AT2018hcd | 2018-10-16.98 | Red LPV |
| AT2018hhy | 2018-10-17.99 | Red LPV |
| AT2018hld | 2018-10-18.89 | Fe II Nova |

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