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The decline of the super-soft X-ray source in Nova Mon 2012

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Nova Mon 2012 has been regularly observed by Swift from 58 days after the Fermi-LAT detection on 2012 Jun 22 (ATEL #4224, ATEL #4310) and monitored approximately daily since the onset of the super-soft source on day 150 (2012 Nov 18). The 0.3-0.8 keV soft X-rays count-rate reached a peak count rate of ~3 count s^{-1} around day 193 (2013 Jan 1), and has since been following a monotonically fading trend (with a super-imposed periodicity of 7.1 hr; Osborne, Beardmore & Page, ATEL #4727).

By around day 247 (2013 Feb 23), the super-soft spectral component had fallen to ~0.03 count s^{-1}, a factor of ~100 below its peak. In contrast, the harder X-ray flux (E > 0.8 keV) has continued to decline much more slowly.

In the UVOT uvm2 filter (central wavelength = 2246 Å), the source has faded continuously since the first observation, more slowly during the super-soft rise and more rapidly since around day 220 (2013 Jan 28). The UV flux thus shows a hint of the super-soft source intensity evolution.

We have monitored the BVRI photometric evolution of Nova Mon 2012 daily since its discovery with several ANS (Asiago Novae and Symbiotic stars) Collaboration telescopes, as well as other facilities including the MDM (Michigan-Dartmouth-MIT) observatory on Kitt Peak (ATEL#4737); spectroscopic monitoring has also been performed with the NOT (Nordic Optical Telescope). [Fe VII] 6086 Å emission turned on after the start of the super-soft emission and is now fading with the ejecta. The photometric decline has been exceptionally smooth during the whole evolution, with the only superimposed noise being caused by the low amplitude 7.1 hr periodicity. Around day 231 (2013 Feb 8), a knee began to develop in the lightcurve simultaneously in all photometric bands. This faster drop in brightness continued for three days (0.25 mag in the B-band, 0.15 in I-band), suggesting a rapidly decreasing energy deposition in the ejecta by the central source. On the fourth day after the knee appeared the nova light started to level off, and then resumed the previous slower decline. A similar knee was observed in U Sco and V407 Cyg at the time the super-soft source was turning off.

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