Ultraviolet Studies of Classical and Recurrent Novae: The Successes of IUE and HST

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Classical and Recurrent Novae are the consequences of accretion of material from a secondary star onto a white dwarf. The material is lost through the inner Lagrangian points into an accretion disk before falling onto the white dwarf. The properties of the outburst depend on the white dwarf mass, the mass-accretion rate, the composition of the accreted material and the white dwarf (carbon-oxygen or carbon-oxygen neon), and the thermal history of the accreted material. Nevertheless, while we do find similarities in outbursts of different novae, the latest studies of the maximum magnitude rate of decline (MMRD) for classical and recurrent novae show that it is a scatter diagram and cannot be used to find the distance to an individual nova.

In the region below we present UV (and optical in some cases) spectra of 3 classical novae for which we have high resolution UV spectra. These are V339 Del (2015) as a C nova (Shore et al. 2016), A24a, 590 (12), V559 Mon (2012) as_O Ne nova and V360 Del which is of an unknown type and possibly a transition event between O and O Ne novae. In the panel to the right, we compare the spectrum of V339 Del to that of OS And (1988) which was well studied by IUE (Shore et al. 2016).

There are UV high dispersion spectra for the following Classical novae:

- V339 Del (UVE)
- NSC 1990 no 3 (UVE)
- T Pyx (STIS, G24)

There are UV high dispersion spectra for the following Recurrent novae:

- RS Oph (UVE)
- Nova LMC 1990 no 2 (UVE)
- V39 Del (STIS)
- V360 Del (STIS)
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The Discovery of Oxygen-Neon Novae: Williams et al. 1985

These figures highlight the IUE studies of O Ne Classical Novae:

1. UV data are extremely important for obtaining the nitrogen, carbon, and neon abundances.
2. The simultaneous appearance of the Hα 6563 (O Ne) and (Ne II) 3422 (O Ne) suggests iron enrichment in the ejected gas.
3. O Ne Classical Novae are found in our galaxy and the LMC with extremely similar abundances.
4. V360 Del 1991 was very depleted in oxygen and enriched in sulfur.