8-13 micron Spectroscopy of V838 Mon

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By taking advantage of three nearly back-to-back observing runs with three different instruments an unprecedented spectral coverage of V838 Monocerotis was obtained.

Originally thought to be a novae because of its sudden brightening, the object soon began to behave in a unique way. In only a few months the spectrum changed from that of a K-type star to “later than M10.”

Between late December 2002 and Feb 2003, spectra of the object were made from Lick Observatory and the IRTF.

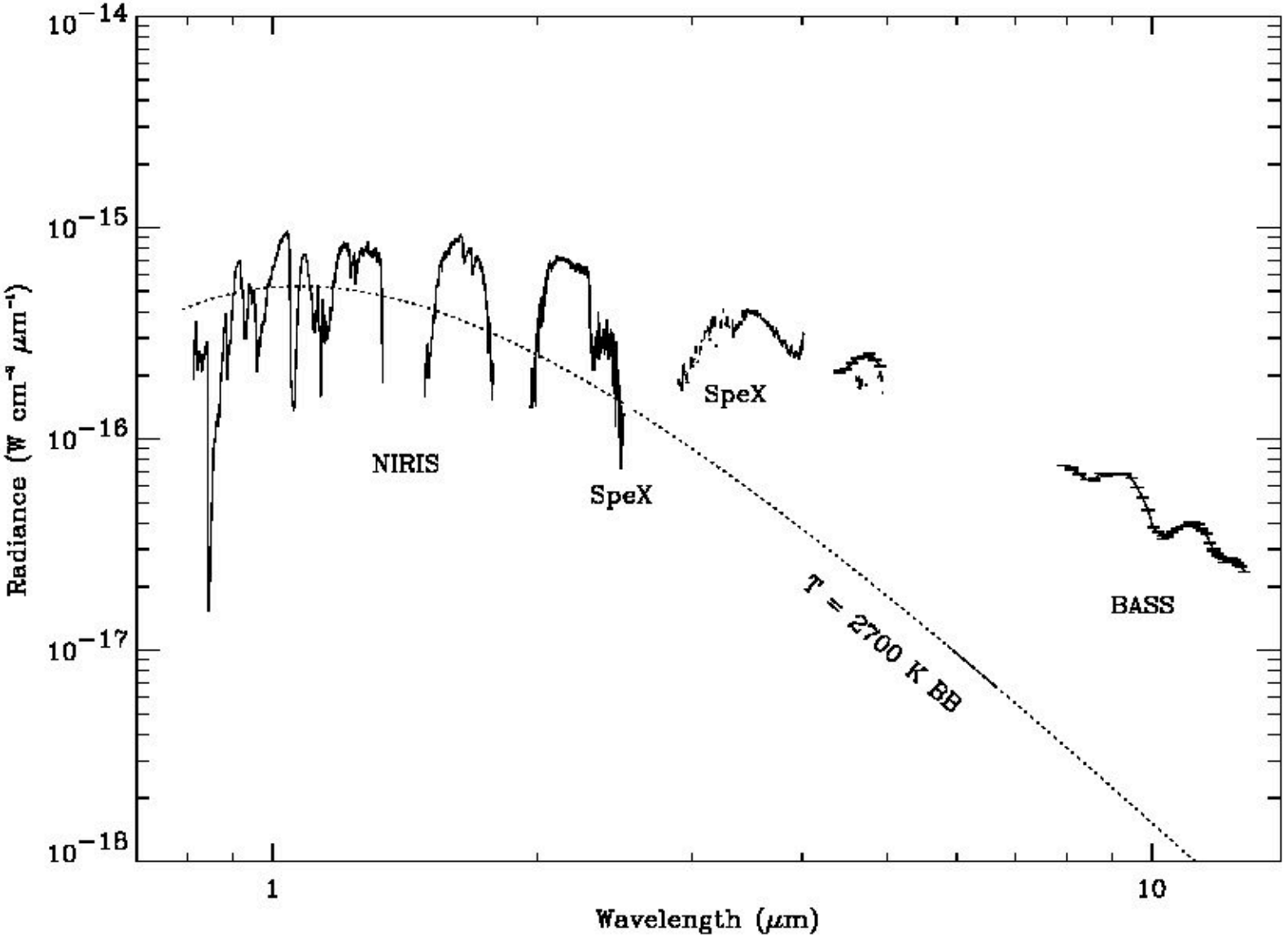
Instruments used:

0.8 – 2.5 μm: The Aerospace Corporation's Near Infrared Imaging Spectrograph (NIRIS) at Lick Observatory.

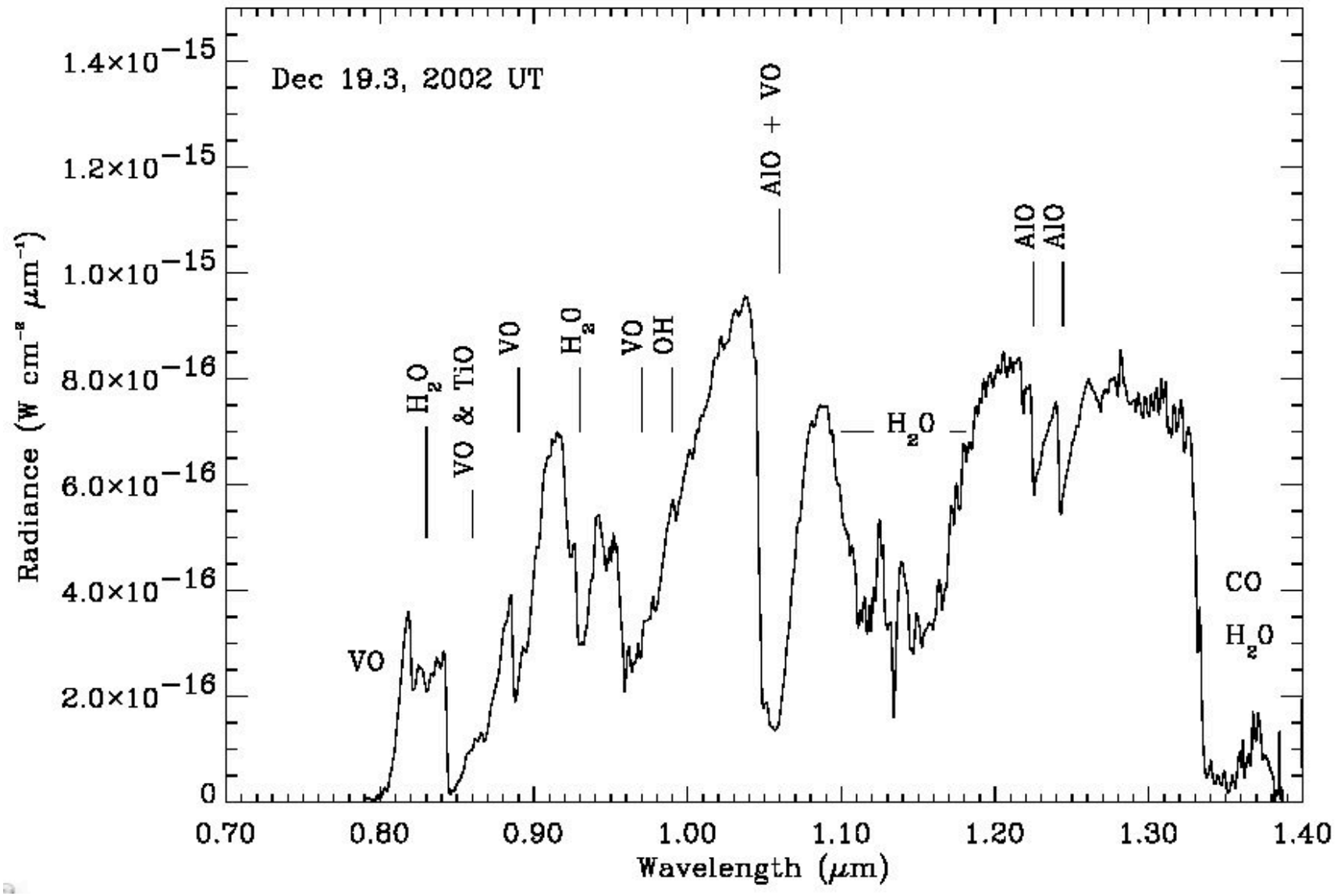
2 – 5.5 μm: the IRTF's SpeX.

3 – 14 μm: The Aerospace Corporation's Broadband Array Spectrograph System (BASS) at the IRTF.

The resulting spectrum, with unusually large wavelength coverage is shown in the next slide.



Note the very deep molecular absorption at 1-5 microns and the unusual 10 micron spectral features.



Note the presence of late spectral type absorption features-- water, VO, TiO.

Summary

V838 Mon's rapid transformation from a faint G or F star to a bright "later than M" class star in a few months may represent a previously unobserved stage in stellar evolution, or perhaps a new kind of star altogether. It is unquestionably oxygen rich as the large number of metal oxides shows. The presence of Sr II and possibly other s process elements suggests that the object has evolved at least to the AGB stage and perhaps beyond. The most dramatic brightening took place in the 10 μm region due to dust formation.