HIGH-RESOLUTION MID-IR LINE SURVEY OF THE LATE-TYPE STAR VY CMa

GUIDO W. FUCHS, EILEEN DÖRING, DANIEL WITSCH, *Institute of Physics, University of Kassel, Kassel, Germany*; THOMAS GIESEN, *Institute of Physics, University Kassel, Kassel, Germany*; THOMAS K GREATHOUSE, ROHINI S GILES, *Space Science Department, Southwest Research Institute, San Antonio, TX, USA*; JOHN H. LACY, *Department of Astronomy, The University of Texas at Austin, Austin, TX, USA*; EDWARD J MONTIEL, *USRA, NASA Ames Research Center , Moffett Field, CA, USA*; MATTHEW J RICHTER, *Department of Physics , University of California, Davis , Davis, CA, USA*.

VY CMa is a supermassive, late-type, oxygen-rich star surrounded by a dense envelope of dust and molecules. Radio observations have identified about 25 different molecular species (plus many isotopologues) in the vicinity of this star, but little is known about molecular features in the mid-IR wavelength range. In a recent (and ongoing) line survey, we investigated the region around 7 to 8 and 10 μm with the TEXES instrument at IRTF (Mauna Kea, Hawai'i) and the EXES spectrograph aboard the SOFIA airborne telescope. Both instruments are high-resolution instruments with R=100,000. Preliminary results on the observed NH_3 and SiO spectra will be presented. Other observed spectral features will be discussed. With the decommissioning of SOFIA in September 2022, a high-resolution mid-IR telescope will no longer be available for frequency ranges blocked by the Earth's atmosphere. However, for some applications, the space telescope JWST can be a very valuable tool for studying the envelope of VY CMa, even though it has only a resolution of R=3000. Possible synergies with the current mid-IR line survey and JWST will be discussed.