Near Infrared Spectroscopy of SAGE Sources in the LMC

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Introduction: We have completed an initial followup program to obtain K-band spectra of bright SAGE (Surveying the elements of a Galaxy’s Evolution) sources [1]. The sources were selected from the Spitzer Cycle 3 IRS program, SAGE IRS. Thus our ~40 sources have near infrared and mid infrared spectra which can be used to fully characterize their nature and physical properties.

Sample and Observations: Our sample was chosen using the IRAC and MIPS 24 um data from the SAGE catalog (see [1] and Figure 1). Objects were identified for the Spitzer Cycle 3 SAGE IRS program and included O-rich (AGB and supergiant) and C-rich AGB stars, cluster members, extreme mass losing stars [2], YSOs [3], PNe [4], P-AGB stars, and ‘unknown’ sources.

Spectra were obtained with OSIRIS on the SOAR 4.1-m telescope located at Cerro Pachón, Chile in November, 2007. Only stars with $K_{s} < 12$ were observed at SOAR.

Results:
• The NIR spectra exhibit features which correlate well with the object type from the SAGE catalog [2] for evolved stars ($J-[8] < 4.1$ in Figure 1); see Figure 2.
• Extreme AGB stars [2] appear to show weak CO and CN (Figures 2,3) suggesting they are C-rich and there is a natural evolution off the optically visible C-rich branch of the CMD onto the Extreme or dust enshrouded branch (Figure 3).
• None of the seven SOAR YSO candidates showed features of young massive stars, though the full IRS sample does confirm other YSO candidates [6].

References:

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