New Infrared Emission Features and Spectral Variations in NGC 7023

Sellgren, K.; Uchida, K. I.; Werner, M. W.; Marengo, M.; Gordon, K. D.; Morris, P. W.; Houck, J. R.

Abstract

We have observed the reflection nebula and photodissociation region NGC 7023, with the long-slit SL and LL modules, and the SH module, of the InfraRed Spectrograph (IRS) on Spitzer. We also present InfraRed Array Camera (IRAC) and Multiband Imaging Photometer for Spitzer (MIPS) images of NGC 7023 at 3.6, 4.5, 8.0, and 24 microns. We observe the classic aromatic emission features at 6.2, 7.7, 8.6, 11.3, and 12.7 microns, plus a wealth of weaker features. We have discovered new unidentified interstellar emission features at 6.7, 10.1, 15.8, 17.4, and 19.0 microns. Possible identifications include aromatic hydrocarbons or nanoparticles of unknown mineralogy. We also observe variations in relative feature strengths, central wavelengths, and feature widths, for both the classic aromatic features, and in weaker emission features. These variations occur with distance from the star, with physical conditions (neutral vs. molecular gas), and with nebular position (southeast vs. northwest).

We thank the teams and people whose dedicated work made the Spitzer Space Telescope a reality. Support for Spitzer, and the IRS, IRAC, and MIPS instruments, was provided by NASA.