

Modeling the Infrared Emission of C₆₀

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Neutral C₆₀ has recently been detected in reflection nebulae, protoplanetary nebulae, planetary nebulae, Herbig Ae/Be stars, and young stellar objects through their characteristic infrared emission bands. We model the vibrational excitation of C₆₀ and calculate the infrared emission spectra of C₆₀ in a wide variety of regions (e.g. reflection nebulae excited by stars of a range of effective temperatures, (proto) planetary nebulae, and dust disks around Herbig Ae/Be stars). The strength of each band (per C atom) and the relative band strength are tabulated for these regions. By comparing with observed C₆₀ spectrum, this table allows one to derive the abundance of C₆₀, and the physical conditions (i.e. the starlight intensities).

Single-photon heating and IR emission spectrum of C₆₀ illuminated by the general interstellar radiation field.

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