

Spectral Analysis of Protoplanetary Disks

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Planets form around young stars in disks of dust and gas, which we call protoplanetary. Direct observations of planets outside of our solar system are difficult for the nearest planetary systems and impossible for more distant systems, so in order to study planet formation we observe protoplanetary disks. We are interested specifically in stars with protoplanetary disks in the Small Magellanic Cloud (SMC), a dwarf galaxy close to the Milky Way. The chemical environment of the SMC mimics the early universe because the ratio of heavy elements to hydrogen is low in comparison to our galaxy. An understanding of how planet formation occurs in the SMC and how it differs from planet formation in the Milky Way would help us to better understand the process by which planets formed in the early universe and how this process evolved to its present formulation. We obtained infrared and optical spectral data of ten stars in the SMC that we believe to be surrounded by protoplanetary disks. In the spectral data we find emission and absorption features due to polycyclic aromatic hydrocarbons, molecular hydrogen, silicate, and several other sources. Through spectral analysis of the data, we conclude that these sources are in fact forming new planets.