Spitzer IRS spectroscopic and MIPS 24 micron imaging observations of the anomalous X-ray pulsar 4U 0142+61

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The isolated, young neutron star 4U 0142+61 is one member of the class of anomalous X-ray pulsars (AXPs) that are believed to possess 10^{14} G superstrong magnetic fields (magnetars). In our recent SpitzerIRAC imaging observations of the source, we identified its 4.5/8.0 micron mid-infrared counterpart. The flux measurements, combined with the previously reported opticalnear-IR measurements, likely indicate the discovery of a fallback debris disk around this pulsar. This putative disk provides the first example of fallback disks, whose existence has long been predicted by the theoretical studies of supernovae and has been occasionally needed in the radio pulsar phenomenology. To further our study of the disk, we have made Spitzer IRS 7.5-14 micron spectroscopic and MIPS 24 micron imaging observations of 4U 0142+61. Here we report on the results from the observations.