

A debris disk around an isolated young neutron star

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We have detected a dusty debris disk around the anomalous X-ray pulsar 4U 0142+61 using mid-infrared data from the Spitzer Space Telescope. The disk does not power the pulsar's X-ray emission but is passively illuminated by these X-rays. The inner disk edge lies well outside the pulsar light cylinder, likely due to dust sublimation. The mass of the disk is of order 10 Earth masses and its lifetime significantly exceeds the pulsar's spin-down age, supporting a supernova fallback origin. The disk resembles protoplanetary disks seen around ordinary young stars, suggesting the possibility of planet formation around young neutron stars.