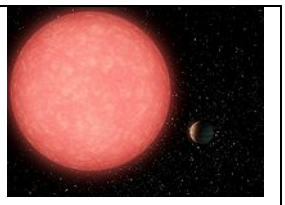
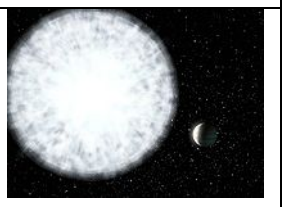
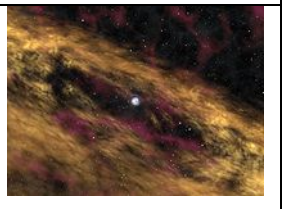
Hidden Universe of the Spitzer Space Telescope

Episode 1: Planetary Life after Death

Like a Phoenix rising from the ashes, astronomers have found that a whole new solar system may be forming in the wake of a star's violent death…	
This is the Hidden Universe of the Spitzer Space Telescope, exploring the mysteries of infrared astronomy with your host Dr. Robert Hurt.	
When a massive star reaches the end of the line, it "does not go gentle into that good night." It becomes a ***supernova***, an explosion so bright that it briefly outshines everything else in the galaxy.	
Most of the heavy elements that make up planets, and even people, are forged in the nuclear furnaces of such explosions. Here we see heavy elements in the Cassiopeia A supernova remnant blowing back into the galaxy and mingling with interstellar gasses.	
The next generation of baby stars forms from this material, now enriched with the building blocks for growing new solar systems and planets. But what of the star that went supernova? Its core still remains, in the form of a pulsar. This stellar corpse is tiny and dense, squeezing about one and a half times the mass of the Sun into an object a mere 10 miles across.	
A team led by Dr. Deepto Chakrabarty, at the Massachusetts Institute of Technology, has found that even a dead pulsar might play host to a whole new generation of planet formation. They studied a once-massive star that went supernova about 100,000 years ago. In the process it likely wiped out any existing planets. While most of the star-stuff blew off into space, a little bit fell back under the pull of gravity. Dr. Chakrabarty explains.	
"If the original massive star was spinning fast enough then that material won't fall directly back onto the pulsar but may instead form a disk, and so what we think we've found is a disk of this debris material that's left over from the explosion that formed the pulsar." This disk has about ten times the Earth's mass and looks	

very much like ones that produce planets around young stars. Moreover, it may help solve a recent planet-making mystery.	
In 1992 astronomers found the first planets outside our solar system. which were orbiting an older pulsar. But where did they come from? Could they have formed after their star went supernova? The discovery of a planet-forming disk around a ***younger*** pulsar makes this seem likely. It seems new planets ***can*** arise from the ashes of their own star's death. However, pulsar planets are pretty hostile real estate for life. Pulsars provide little light or heat, and would bathe these worlds in intense radiation. A nuclear waste dump at the South Pole might actually be a little ***more*** pleasant!	
The Hidden Universe is produced by the Spitzer Science Center at the California Institute of Technology in Pasadena. The Spitzer mission is managed by NASA's Jet Propulsion Laboratory.