The Helix Nebula in Aquarius. *(Hale Observatories)*

La nébuleuse de l'Hélice, dans le Verseau. *(Hale Observatories)*

the universe, matter which is not hot enough to emit visible light often gives off infrared radiation.

A major accomplishment of infrared astronomy has been the discovery of dust surrounding certain stars. As visible light emerges from the star core, it is absorbed by dust in the stellar atmosphere, re-emerging and continuing its outward journey as infrared radiation. At the same time, it gives a tremendous push to the dust particles, driving them, along with gas molecules, away from the star and into interstellar space. "This wind of gas and dust," says Kwok, "then forms an extensive envelope surrounding the star. Although it cannot be seen, it blazes forth vividly when viewed with an infrared telescope.

"The red giant has deposited so much material around itself that it does not need to suddenly expel something to form a planetary nebula," continues Kwok. "All the remaining white dwarf has to do is simply light up ejected material that had been previously invisible." In lighting up this material the dwarf provides the system with a new and more energetic wind. With more than one hundred times the velocity of the wind that had been generated by the outer shell, the core's particles push firmly against the circumstellar cloud. Over a span of several thousand years this push begins to give the material a discrete shape, rather like blowing up a balloon in a smoke-filled room—which Kwok describes as a "snowplow effect." The high temperature of the dwarf star causes the forming nebula to glow and is seen by the Earth-bound observer as a faint ring.

If future evidence supports Kwok's theory, not a few ideas about stellar physics will have to be reconsidered, particularly the violent death predicted for most red giants. The accepted thesis that our sun will ultimately explode may be replaced by the likelihood of it simply withering away, leaving behind its own planetary nebula. □

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