Down but not out: the white dwarf survivors of low luminosity thermonuclear supernovae.

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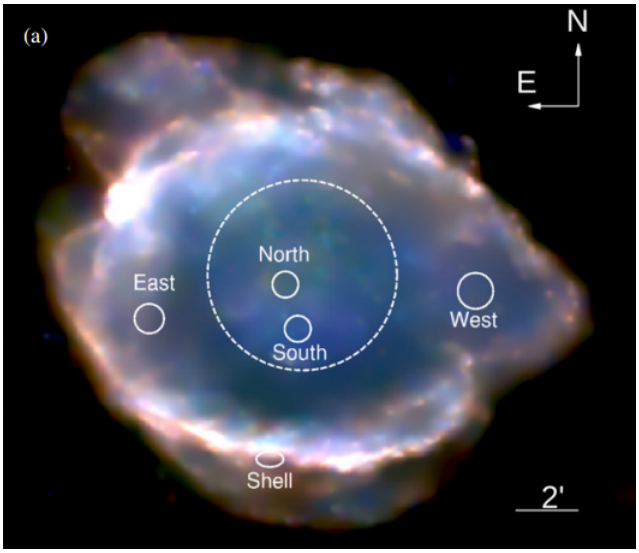

Figure 1. *Chandra* image of the supernova remnant G299.22.9 (Post et al. 2014), which has been inferred to be the remnant of a low-energy Ia-like transient (Park et al. 2007).

1 MOTIVATION

Type Ia supernovae (SNe) occur in a variety of flavors, most of which are believed to originate from deflagrations or explosions in carbon-oxygen white dwarfs (WDs). A significant fraction ($\sim 15\%$ of Ia-like transients are short, low luminosity events (Perets et al. 2011) that likely have different progenitors from normal Ia SNe. In these cases, the eruption could eject a fraction of a solar mass, but still leave behind a bound (but greatly disturbed) WD remnant. Long after the SN, these remnants could resemble the recently discovered pure oxygen atmosphere WD Kepler et al. (2016), or other strange WDs found in large spectroscopic surveys. While compelling, the connection between low-luminosity peculiar thermonuclear transients (PTTs) and WD progenitors remains indirect.

We propose to establish the relationship between PTTs and WD progenitor systems by detecting and characterizing bound WD remnants at the centers of SN remnants. Dozens of SNe remnants in the Milky Way have been inferred to arise from type Ia supernovae, but the

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