Luminous red novae in the IR and sub-millimetre

Thomas Steinmetz
CAMK Torun, Poland
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Supervisor: Tomasz Kaminski

Publications

1. `OGLE-2002-BLG-360: A dusty anomaly among red nova remnants' - **T. Steinmetz**, T. Kaminski, C. Melis, N. Blagorodnova, M. Gromadzki, K. Menten, and K. Su, A&A, 699, A316 (2025)
2. `A 500 pc volume-limited sample of hot subluminous stars. II. Atmospheric parameters, mass distribution, and kinematics' - H. Dawson, S. Geier, U. Heber…**T. Steinmetz**…, Accepted to A&A (in production)
3. `Is the nitrogen-rich source PN K4-47 a true planetary nebula?' – **T. Steinmetz,** T. Kaminski, D. Jones, M. Hajduk, D.R Goncalves, S. Akras – in prep.

Conferences in 2025

1. PRIMA working meeting, 19–21 May 2025, CalTech, Pasadena, USA - contributed talk and poster
2. EAS 2025 annual meeting, 23–27 June 2025, University College Cork, Cork, Ireland - Contributed talk and poster presentation
3. Binary Stars in the Space Era, 1–4 July 2025, Keele University, Keele, UK - poster presentation
4. Charting the Cosmos: From Cosmic Stellar Nurseries to Evolved Stars Using High Powered Telescopes, 18–2 August 2025, Ingelheim, Germany – poster presentation
5. 42nd PTA Meeting, 8–12 September 2025, Warsaw University, Warsaw, Poland - Contributed talk
6. **Asymmetrical post-main-sequence Nebulae 9 (APN9): The art of stellar wind sculpting, 22–26 September 2025, IAA-CSIC, Granada, Spain - Contributed talk**

OGLE-2002-BLG-360

- Dusty red nova erupted in 2002
- Long-timescale (~3-4 years) eruption
- No clear emission in optical, IR or sub-mm
- Spherical dust shell with high optical depth (Tylenda et al. 2013)

A&A, 699, A316 (2025)
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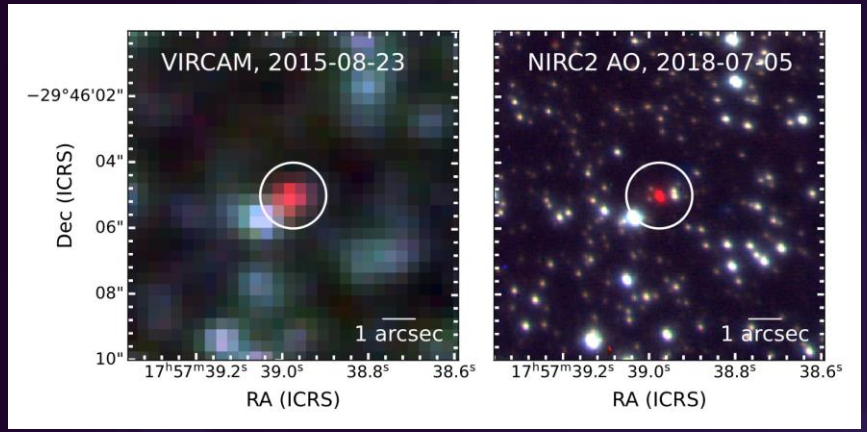
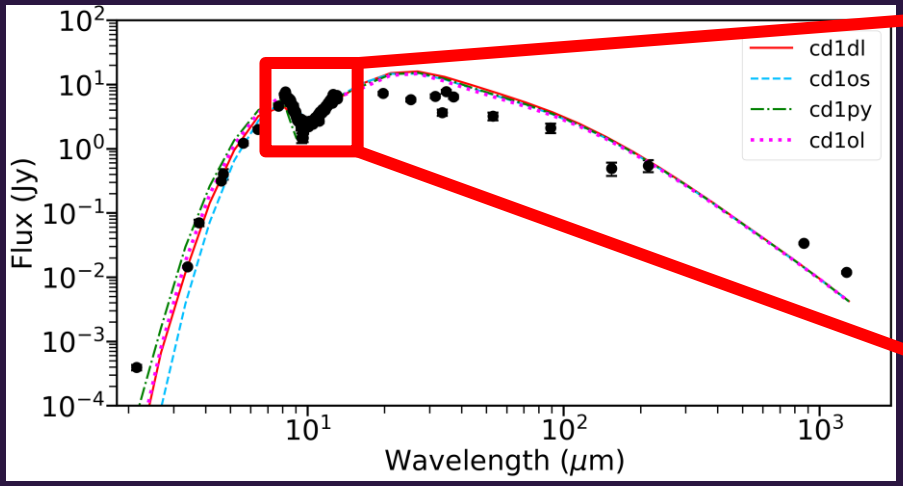
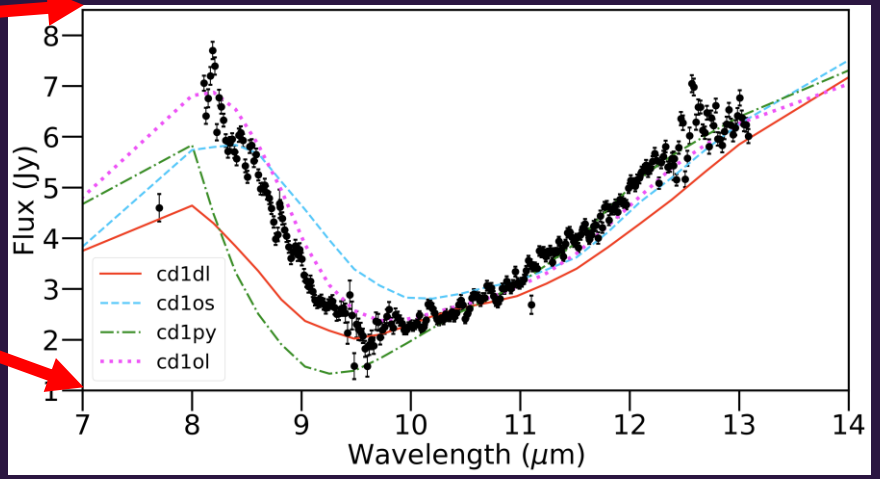
Astronomy & Astrophysics

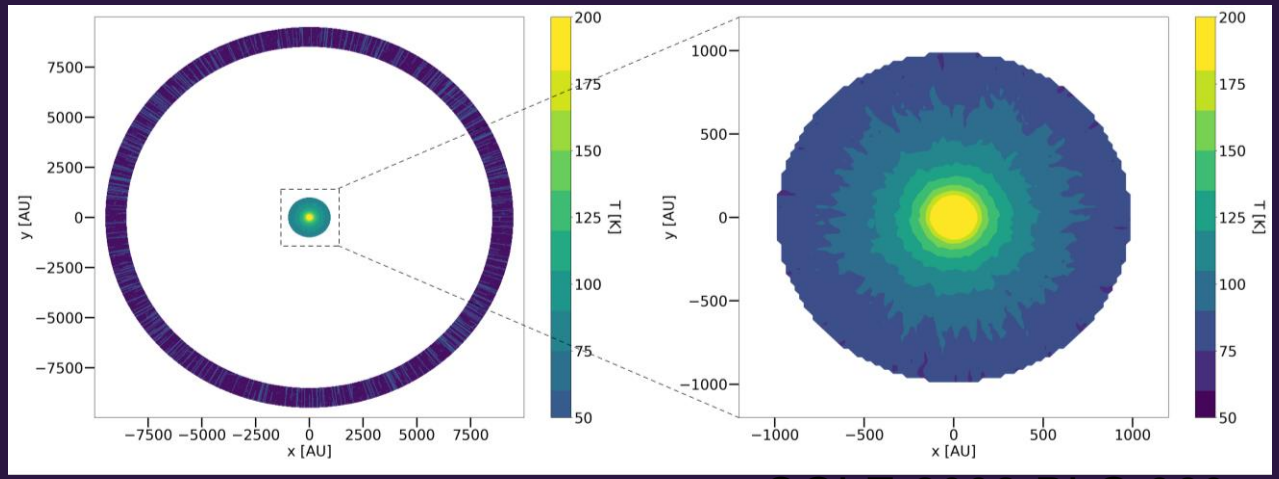
OGLE-2002-BLG-360: A dusty anomaly among red nova remnants

T. Steinmetz[1,⋆], T. Kamiński[1,⋆], C. Melis[2], N. Blagorodnova[3,4,5], M. Gromadzki[6], K. Menten[7,⋆⋆], and K. Su[8]





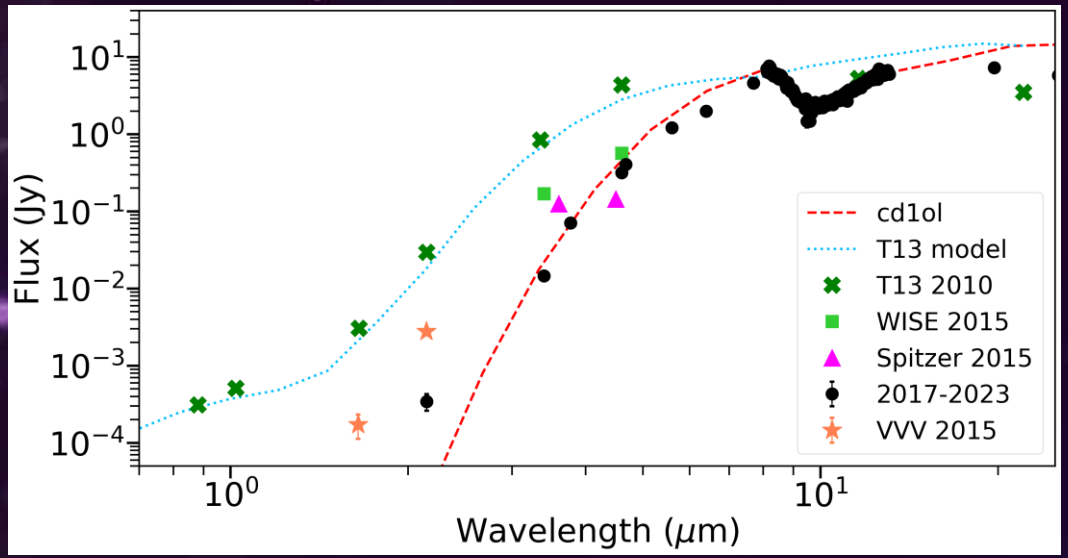




- 3200 K, 150 $R_\odot$, L=1.65x10^3 $L_\odot$
- Dust:
- 58% metallic Fe
- 25% silicates
- 17% alumina
- M_d=0.012 $M_\odot$

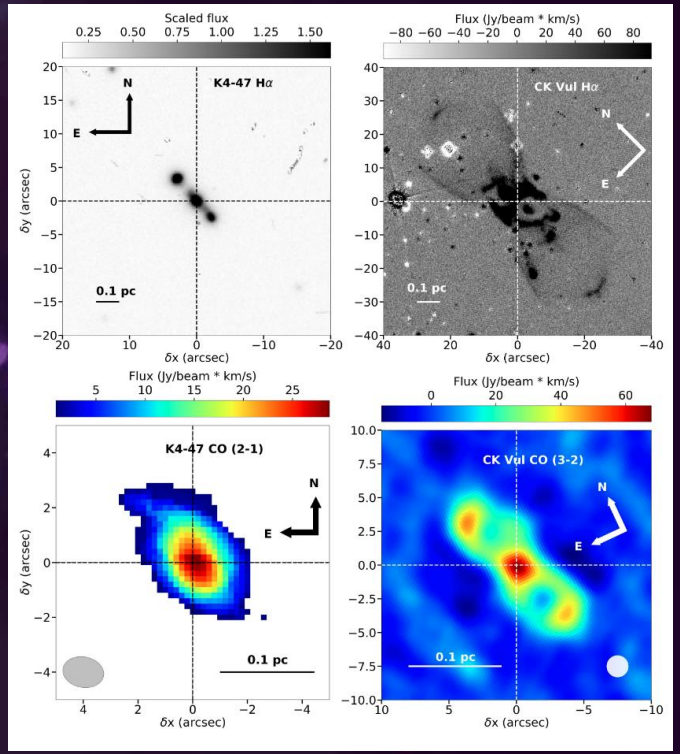
OGLE-2002-BLG-360

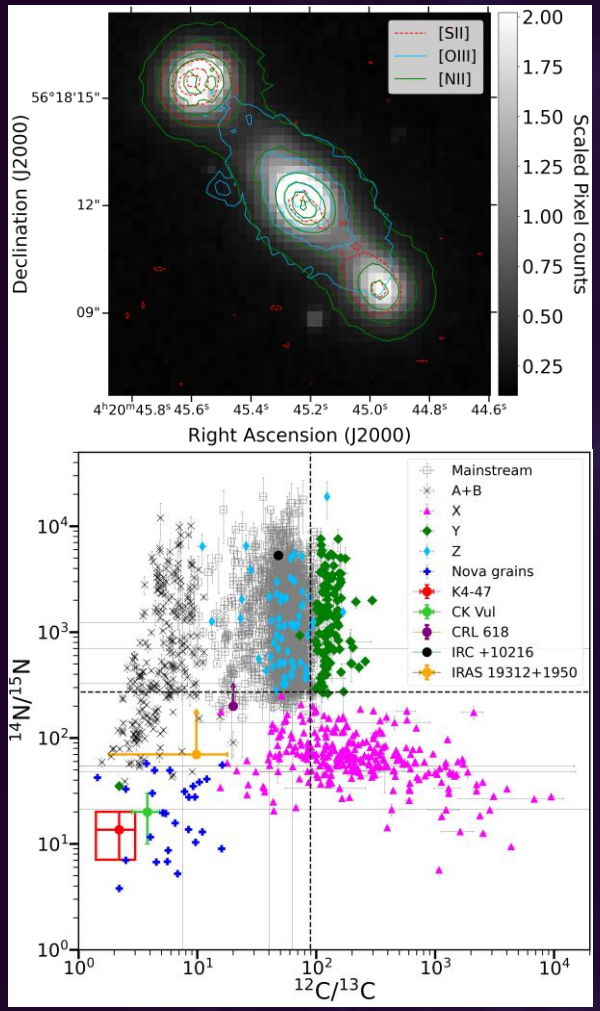
Morphology: OGLE-2002-BLG-360



Parameter	2010	2017–2023
$R_\star$ ($R_\odot$)	150	150
$T_\star$ (K)	3200	3000
r_{in} (AU)	≤ 20	10
r_{in}^{cav} (AU)	700	1000
ρ_{max} (g cm^{-3})	5.72×10^{-18}	1.91×10^{-17}
Dust mass ($M_\odot$)	3.44×10^{-3}	0.012
Stellar luminosity ($L_\odot$)	2126	1646

K4-47





- Carbon-rich, very young (300-400 yr) PN
- Isotopic enrichment reminiscent of CK Vul (Nova 1670)
- T_{WD}=81 kK, M_{WD}=0.9-1.1 $M_{\odot}$
- v_{ej} = 350 km/s for bipolar outflow, ~50 km/s for molecular gas
- Shocks contribute to excitation in core
- 4-6 $M_{\odot}$ progenitor