Core–Halo Structures in the ^{12}CO Emission of CIT 6, AFGL 618 and IRAS 21282+5050

M. Meixner[1], M.T. Campbell[1], W.J. Welch[2], L. Likkel[3] and M. Tafalla[4]

[1]University of Illinois, Urbana–Champaign; [2]University of California, Berkeley;
[3]University of Wisconsin, Eau Claire; [4]Harvard-Smithsonian C.f.A

We present full synthesis ^{12}CO J=1–0 line emission images of three carbon rich evolved stars: CIT 6, AFGL 618 and IRAS 21282+5050. Each of these objects represents a different stage of evolution: CIT 6 is a carbon star still on the AGB, AFGL 618 is a transition object, and IRAS 21282+5050 is a young planetary nebula. Common to all three sources, we find what appears to be two mass loss components: a bright "core" located at the center of the source and a fainter "halo" surrounding the core (see Table below for observed characteristics). We speculate that the bright core was created by a more recent and higher mass loss rate wind than the fainter surrounding halo. However, concrete support for this idea awaits radiative transfer modelling of the ^{12}CO that we are currently pursuing. Our full synthesis data are combined from millimeter interferometry using the Berkeley–Illinois–Maryland millimeter array (BIMA) and single dish maps using the NRAO 12m. We find that full-synthesis imaging, which combines the sensitivity of single dish and the spatial resolution of interferometry, is the only means to reveal such core-halo structures.

Quantity	CIT 6	AFGL 618	IRAS 21282+5050
Total Line Flux(Jy×km s^{-1})			
Combined	2800 ± 300	1700 ± 200	940±90
$V_{expansion}$ (km s^{-1})			
core	13	27	16
halo	18	24	16
Diameter ($''$)			
core	18	12	6
halo	80	80×50	14

https://doi.org/10.1017/S0074180900131341 Published online by Cambridge University Press