

## N17a Seimei KOOLS-IFU Mapping of the Gas and Dust distributions in the PN IC2165

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I investigated physical and chemical properties of the gas and dust components in the C-rich planetary nebula (PN) IC2165 using the superior resolution 2-D emission-line maps. The extinction map is generated in a self-consistent and assumption-free manner. The circumstellar gas-to-dust mass ratio (GDR) map ranges radially from 1210 in the central nebula filled with hot gas plasma to 120 near the ionisation front. The obtained GDR is comparable to  $\sim 400$ , which is commonly assumed for C-rich AGB stars, and  $\sim 100$  for ISM. Except for the inner regions, GDR in IC2165 is almost the same as that in such AGB stars, indicating that most of the dust grains endure under the harsh radiation field without being destroyed. The gas and dust mass distributions concentrated in the equatorial plane could relate the non-isotropic mass-loss during the AGB phase and subsequent elliptical nebula formation. I investigated the spatial-distributions of electron densities/temperatures and ionic/elemental abundances. I determined 13 elemental abundances by using PSF-matched spatially-integrated multiwavelength spectra extracted from the same aperture. Their values are consistent with the predicted values by the theoretical model for stars of initially  $1.75 M_{\odot}$  and  $Z = 0.003$ . Finally, I constructed the photoionisation model using my distance measurement to ensure that it corresponded to all of the derived quantities and the post-AGB evolution. The model perfectly reproduced the observed/derived quantities, including the GDR and gas/dust masses. Through the present work, I demonstrated the capability of KOOLS-IFU and how IFU observations can shed light on the spatial variation of the gas and dust components in PNe.