N23c Physical properties of the planetary nebula Hu2-1 with Seimei/KOOLS-IFU

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We investigate physical properties of the planetary nebula (PN) Hu2-1 based on spectroscopic and photometry data in the range from $\sim 0.1 - 140\,\mu$m. Seimei 3.8-m/KOOLS-IFU spectra greatly help us deriving the representative physical parameters of the dusty nebula. By the combined use of the UV *IUE* and mid-IR *AKARI*/IRC and *Spitzer*/IRS spectra, we succeed in the abundances of the nine elements, indicating that Hu2-1 is a low metallicity ([Ar/H]$\sim$–0.5) and C-rich PN. The derived elemental abundance pattern can be along the asymptotic giant branch star nucleosynthesis models for stars with initial mass $\sim 2\,M_\odot$ and metallicity $Z \sim 0.008$. *Spitzer*/IRS displays the broad $11\,\mu$m SiC feature as well as the weak emission attributed to the neutral $11.3\,\mu$m polycyclic aromatic hydrocarbon. The feature-less dust continuum would be thermal emission from graphite grains. We constructed the photoionisation model to be consistent with all observed quantities by adopting the distance estimated by *gaia*. Our model suggests that Hu2-1 originated from a $\sim 2\,M_\odot$, which is consistent with the prediction in terms of abundance pattern. Majority of the gas/dust masses exist beyond the ionization front, demonstrating the critical importance of the cryogenics regions for understanding stellar mass-loss and galaxy chemical evolution.