

**Q02a Line ratio map of [Ne V] fine-structure lines toward a colliding wind binary WR140**

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Dust plays a major role in the life cycle of stars and planets. Massive colliding wind Wolf-Rayet binaries are potentially important dust sources throughout cosmic time. However, the formation and survival of dust in such a system are not well certificated. We present an observation of a Wolf-Rayet binary WR140 with the James Webb Space Telescope(JWST) Mid-Infrared Instrument(MIRI) Medium-Resolution Spectrometer under the early release science program DustERS(PI: Lau, R.M.) to investigate the system with its unprecedented sensitivity and spatial resolution in mid-IR with a velocity resolution of around  $150 \text{ km s}^{-1}$ .

In this study, we present a line ratio map of [Ne V] fine-structure lines around WR140. WR140 is an ideal target for our investigation with its dust formation episodes around periastron passage every of its well-defined orbital period of 7.93 years. We draw a map at velocity bins spread from  $-2000$  to  $+1000 \text{ km s}^{-1}$  by comparing two [Ne V] fine structure lines  $14.3 \mu\text{m}$  and  $24.3 \mu\text{m}$  with critical densities around a few  $\times 10^5 \text{ cm}^{-3}$  observed around the star. We found the enhanced line ratio in a region where a newly formed dust arc is located(Lau, R.M. et al 2022) for the first time, which indicates the higher electron density in the colliding winds.