
OH231.8+4.2: The ALMA close up

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Abstract

OH231.8+4.2, a.k.a. *The Rotten Egg Nebula*, is a molecule-rich bipolar nebula ejected by the QX Pup system. Although it shares many of the characteristics of pre-PNe, the nature of *The Rotten Egg* is still unclear, mainly because of the late spectral type of its main stellar component. OH231.8+4.2 has been studied in detail in a large range of wavelengths but no sub-arcsecond mapping has been performed yet on molecular lines, apart from the VLBI observations of SiO and H₂O masers. Here we present results from 200-300 mas resolution ALMA observations of both continuum and molecular lines: we have detected 22 rotational transitions of 17 molecular species, including ¹²CO and ¹³CO, CS, and several SiO isotopomers. While CO shows in detail the complex structure of the whole bipolar nebula, other species like CS and SO trace the densest structures in the molecular gas. In contrast, SiO emission better displays the connection between the very young outflow seen in H₂O masers and the older large-scale outflow seen in CO, and helps to locate the position of the central exciting source. The different centres of expansion, deduced for the several nested structures seen in the envelope, put strong constraints on the orbital parameters of the system. We also discuss the nature of the millimetre continuum of both extended and compact components.

Keywords: mass loss, pre, PNe, OH231.8+4.2

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