

Constraining the Composition of Exoplanetary Material Using White Dwarf Stars

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There is evidence that main sequence (MS), giant, and white dwarf (WD) stars have circumstellar (C-S) material that originates from the small-body populations of their planetary systems. How (if at all) are the planetesimals around MS and WD stars related? One way to address this question is to begin at the end of the stellar life cycle for sun-like stars, with the 30% of WDs that have unexpected heavy elements in their photospheres. This pollution likely arises from the accretion of planetesimals that were perturbed by outer planet(s) to the WD's tidal radius. These planetesimals sublimate, turning into C-S gas, and accrete onto the WD surface. In this talk, I describe a method to determine the abundances of elements producing C-S gas features in the spectra of the ~30 known polluted WDs with emission features. My work will provide a key to quickly understand the instantaneous composition of the material flowing from the planetesimals and will help constrain the radial locations of different gas components.

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