OBSERVATIONS OF CIRCUMSTELLAR THERMOCHEMICAL EQUILIBRIUM: THE CASE OF PHOSPHORUS

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We will present observations of phosphorus-bearing species in circumstellar envelopes, including carbon- and oxygen-rich shells[1]. New models of thermochemical equilibrium chemistry have been developed to interpret, and constrained by these data. These calculations will also be presented and compared to the numerous P-bearing species already observed in evolved stars[1,2,3,4,5]. Predictions for other viable species will be made for observations with Herschel and ALMA.

[1] Milam et al. 2008, ApJ, 684, 618. [2] Tenenbaum & Ziurys 2008, ApJ, 680, L121. [3] Agundez et al. 2008, A&A, 485, 33. [4] Tenenbaum et al. 2007, ApJ, 666, L29. [5] Halfen et al. 2008, ApJ, 677, L101.