

## PHOSPHORUS CHEMISTRY IN OXYGEN RICH STARS

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Observations of PO and PN have been carried out at the Arizona Radio Observatory at 1, 2, and 3 mm. Multiple transitions of PO and PN have been detected towards the O-rich AGB stars TX Cam and RCas. Data obtained toward supergiant stars VY Canis Majoris and NML Cyg have also been analyzed. Abundances were obtained for these molecules in all four objects using the radiative transfer code ESCAPADE, which is suitable for symmetric and asymmetric stellar outflows. The abundances of PN and PO were found to be in the range  $10^{-8}$  -  $10^{-7}$  relative to  $H_2$ . While PN appears to be a parent molecule formed by LTE chemistry near the stellar photosphere, PO appears to be created further out from the star at  $r > 400 R_*$ .