

# Infrared Detection of Gas Phase Formaldehyde in W33A

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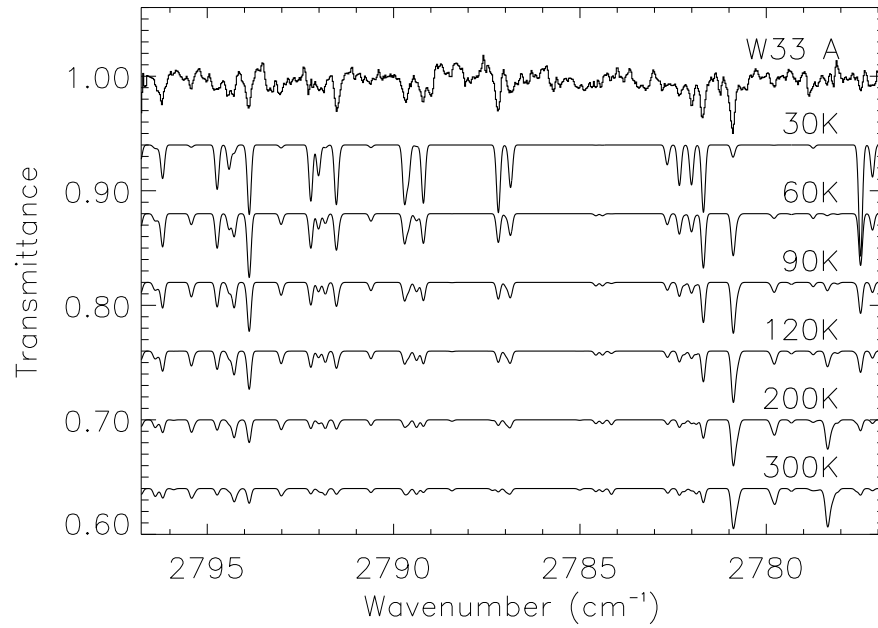
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**Abstract.** We report the detection of lines of the  $\nu_1$  vibration-rotation band of gaseous formaldehyde ( $\text{H}_2\text{CO}$ ) near 3.6 microns in absorption toward the high mass protostar W33A. The formaldehyde is at a temperature of approximately 100 K and has a column density only a few percent that of solid formaldehyde seen along the same line of sight. These characteristics suggest that the gas phase formaldehyde has evaporated off of dust grains in a small fraction of the cloud that has been warmed indirectly by the central star. This region is probably just outside the source of the infrared continuum. No gas phase formaldehyde was detected toward RAFGL 7009S; the upper limit on its abundance is roughly five times less than the abundance toward W33A.

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**Figure 1.** Formaldehyde  $\nu_1$  stretching mode spectrum observed toward W33 A. Upper trace: W33 A transmittance spectrum obtained by dividing the astronomical spectrum, recorded at UKIRT with a spectral resolution of  $R \sim 33000$ , by an estimated dust local continuum. Lower traces: Simulated LTE spectra of  $\text{H}_2\text{CO}$  at various excitation temperatures, with a column density of  $2.10^{16} \text{cm}^{-2}$  using the HITRAN database parameters (Rothman et al. 2003, JQRST 82, 5). The spectra were generated using a turbulent velocity width of  $8.6 \text{ km.s}^{-1}$  (Mitchell et al. 1988, ApJ 333, L55) and convolved to the observed resolution.