Observations of Rotationally Resolved C₃
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abstract The rotationally resolved spectrum of the A\(^1\Pi_u \leftarrow X\(^1\Sigma_g^+\) 000-000 transition of C₃, centered at 4051.6 Å, has been observed along 10 translucent lines of sight. To interpret these spectra, a new method for the determination of column densities and analysis of excitation profiles involving the simulation and fitting of observed spectra has been developed. The populations of lower rotational levels (J<14) in C₃ are best fit by thermal distributions that are consistent with the kinetic temperatures determined from the excitation profile of C₂. Just as in the case of C₂, higher rotational levels (J>14) of C₃ show increased nonthermal population distributions in clouds which have been determined to have total gas densities below \~500 cm\(^{-3}\).