UNIFIED ANALYSIS OF 14 DATA SETS INTERCONNECTING 12 ELECTRONIC STATES OF As_2

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The entire emission spectrum of gas phase As_2 below 32,000 cm^{-1} excited by microwave or high voltage discharges has been measured using a high resolution Fourier-transform spectrometer (Bruker IFS 120HR) with very sensitive Ge or InSb detectors. Its analysis yielded data on fourteen electronic band systems among the twelve electronic states: $X\,0_g^+(^1\Sigma)$, $A'\,0_u^-(^1\Sigma_u^-)$, $D\,1_g(^1\Pi_g)$, $a\,0_u^+(^3\Sigma_u^-)$, $a\,1_u(^3\Sigma_u^-)$, $c\,1_u(^3\Sigma_u^+)$, $c\,0_u^-(^3\Sigma_u^+)$, $e\,1_u(^3\Delta_u)$, $e\,2_u(^3\Delta_u)$, $f\,0_g^+(^3\Pi_g)$, $f\,0_g^-(^3\Pi_g)$ and $f\,1_g(^3\Pi_g)$. Rather than analyze these band systems in a series of independent two-state analyses, we have performed a comprehensive combined analysis of all data sets simultaneously, using program DSParFit.[b] Differences between the present results and those obtained from independent two-state analyses, will be discussed.

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