LINE LISTS FOR THE $b^1\Sigma^+ - X^3\Sigma^-$ AND $a^1\Delta - X^3\Sigma^-$ TRANSITIONS OF SO

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SO is an important radical found in many astronomical sources such as the atmosphere of Io and the atmosphere of Venus. In order to create more complete line lists, we fit spectroscopic data on SO from the literature using PGOPHER. The fits covered v=0 to v=6 for the $X^3\Sigma^-$ state, v=0-5 for the $a^1\Delta$ state and v=0-2 for $b^1\Sigma^+$ state. The B_v and G_v polynomial coefficients for each state were input into LeRoy's RKR program to produce pointwise potential energy curves. High level *ab initio* calculations, including spin-orbit coupling, were carried out to obtain the electric transition dipole moment functions for the nominally forbidden $b^1\Sigma^+ - X^3\Sigma^-$ and $a^1\Delta - X^3\Sigma^-$ transitions. The RKR potentials and transition dipole moment points were input into LeRoy's LEVEL program to calculate the transition dipole matrix elements for all possible b-X and a-X bands. For the $b^1\Sigma^+ - X^3\Sigma^-$ transition, the electric and magnetic transition dipole matrix elements were scaled using the experimental values of $\mu_0 = 0.0107$ D, $\mu_1 = -0.0119$ D and M = 0.16 μ_B obtained by Setzer *et al.*[a] for the 0-0 band. The transition dipole moment matrix elements were used in PGOPHER to produce our line lists for the $b^1\Sigma^+ - X^3\Sigma^-$ and $a^1\Delta - X^3\Sigma^-$ transitions.

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[a]K.D. Setzer, E.H. Fink, and D.A. Ramsay, High-resolution Fourier transform study of the $b^1\Sigma^+ - X^3\Sigma^-$ and $a^1\Delta - X^3\Sigma^-$ transitions of SO, *J. Mol. Spectrosc.* **198**, 163-174 (1999).