RULES APPLICABLE FOR SPECTROSCOPIC PARAMETERS OF H_2O TRANSITIONS INVOLVING HIGH J STATES

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Two basic rules applicable for H_2O transitions involving high J states have been discovered. The origins of these rules are quantum properties of H_2O rotational states with their J values above certain boundaries. As a result, for transition lines invovling high J states in individually defined groups, all their spectroscopic parameters (i.e., the transition wavenumber, intensity, pressure broadened half-width, pressure-induced shift, and temperature exponent) must follow these rules. One can use these rules to screen spectroscopic data provided by databases and to identify possible errors. In addition, by using extrapolation methods within the individual groups, one is able to predict spectroscopic parameters for lines involving very high J states. The latter are required in developing high-temperature molecular spectroscopic databases such as HITEMP.