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Cross sections for low energy electron impact excitation of the electronic states of water

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We report differential and integral cross sections for excitation of the lowest lying $^3B_1$, $^1B_1$, $^3A_1$, and $^1A_1$ electronic states of water. The energy range of these measurements is 15-50eV and the angular range of the DCS measurements is 10°-90°. From these DCS the corresponding ICS is calculated using a molecular phase shift analysis technique to extrapolate the data to 0° and 180°. Where possible, comparison is made to the results of available theory. One of the main objectives of this study is to perform statistical equilibrium calculations to determine if the origin of the OH Meinel bands in our atmosphere are due, at least in part, to electron driven processes.