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A new NLTE model for the OH Meinel bands

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In our planet, the hydroxyl radical (OH) not only plays a crucial role as an oxidant in the troposphere but also as a main stratospheric gas. However, its high reactivity, short lifetime, low concentrations and the spectral coincidence of its emissions with the much stronger ones from CO_2 make it a difficult gas to be detected, specially during daytime. The situation is different in the middle atmosphere, where OH is excited during its formation, mainly after recombination of H and O_3. The excited rotational and vibrational states of OH are responsible of the Meinel bands, that dominate the terrestrial nightglow spectrum, in the visible and near-Infrared. The assumption that these states emit according to the Planck function at the local kinetic temperature is no longer valid. Thus Non-Local Thermodynamic Equilibrium (NLTE) models must be used to simulate and analyze them.
In this work we describe a new NLTE model for the OH Meinel bands and we compare the results with previous modeling and data analysis.