H_2^{16}O and H_2^{18}O Maser Emission from Gas-Dust Clouds

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The collisional pumping of H_2^{16}O and H_2^{18}O masers in hot dense gas-dust clouds has been simulated numerically. New data on the rate coefficients for collisional transitions from Faure et al. (2007) were used in the calculations. The possibility of detecting H_2^{18}O emission in 22.2-GHz H_2^{16}O maser sources is investigated. The medium is shown to become optically thick in the H_2^{16}O lines for which an inverted level population is observed at H_2O column densities of ~10^{19}-10^{20} cm^{-2}. A simultaneous observation of H_2^{18}O emission and H_2^{16}O maser emission in the same source will allow the physical conditions in the gas-dust cloud to be refined.

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