

EINSTEIN A-COEFFICIENTS AND STATISTICAL WEIGHTS FOR MOLECULAR ABSORPTION TRANSITIONS
IN THE *HITRAN* DATABASE

MARIE SIMECKOVA, LAURENCE S. ROTHMAN, *Harvard-Smithsonian Center for Astrophysics, Atomic and Molecular Physics Division, Cambridge MA 02138-1516, USA*; DAVID JACQUEMART, *Laboratoire de Dynamiques, Interactions et Réactivités, Université Pierre et Marie Curie, 4 place Jussieu, Paris 75252, France*; ROBERT R. GAMACHE, *University of Mass. Lowell, Department of Environmental, Earth & Atmospheric Sciences, Lowell MA 01854, USA*; AARON GOLDMAN, *University of Denver, Department of Physics, Denver CO 80208, USA*.

The weighted square of the transition moment presented in previous editions of *HITRAN* has been replaced by the Einstein *A*-coefficient in *HITRAN* 2004. The calculation has been performed using the *HITRAN* line intensities S_{HIT} , the statistical weights g_2 of the upper levels and other related quantities

$$A_{21} = 8\pi c \nu_0^2 Q_{tot}(T_0) S_{HIT} / (e^{-c_2 E_1 / T_0} (1 - e^{-c_2 \nu_0 / T_0}) I_a g_2).$$

The motivations and the corresponding theory, including the determination of the statistical weights for molecules of various symmetries, will be discussed.