HIGH RESOLUTION UV EMISSION **CROSS** SECTIONS FOR ANALYSIS OF SATELLITE OBSERVATIONS OF AURORA AND DAYGLOW OF PLANETARY ATMOSPHERES

J.M.Ajello (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91 109; 818 354-2457; e-mail: jajello@jpluvs.jpl.nasa.gov)

1. Kanik, G. James, X. Liu, C. Noren, M. Alvarez (All at: Jet Propulsion Laboratory, California Institute of'1'ethnology, Pasadena, CA 91 109) D. Shemansky (University of Southern California, Los Angeles, CA 90089)

A new generation of high resolution UV imaging spacecraft (Polar, Galileo, HST) are studying the airglow and aurora of the Earth and the Jovian planets. To keep pace with these technological improvements we have developed a laboratory program to provide electron collision cross sections of the major molecular planetary gases (H_2, H, O, N_2, $C0_2$, $S0_2$, 0_2, H_20 and CO). Molecular spectra under optically thin conditions have been measured with a high resolution ($\lambda/\Delta\lambda = 50000$) UV spectrometer in tandem with an electron impact collision chamber. Synthetic spectral intensities and rotational line positions for H_2 based on the J-dependent transition probabilities are in good agreement with experimental intensities. A new high resolution UV model is being developed for modeling laboratory data. The model includes an accurate remeasurement of the Lyman band and Werner band cross sections. The kinetic energy distribution of H(2p) atoms resulting from electron impact dissociation of H_2 has been measured. Electron impact dissociation of H_2 is one of the major mechanisms leading to the observed wide profile of H Lα from Jupiter aurora by HST. Analysis of the deconvolved line profile of I I La reveals the existence of a narrow line peak (40 mÅ FWHM) and a broad pedestal base (240 mÅ FWHM). Follow-on studies of dissociative excitation of S11 1259Å, 01 1304Å emission from $S0_2$ and of NI1200Å, NII1085Å from N_2 also indicate substantial kinetic energy release (1- 10eV). We report a quantitative measurement of the predissociation fraction in the $N_2 c'_4\,{}^1\Sigma_u^+ \rightarrow X\,{}^1\Sigma_g^+$ (0,0) band to model N, EUV emission from Titan, Triton and the Earth. The most recent studies of the excitation cross section of the N_2(a ^{1}Ilg) state will be discussed. We report the first study of] 1 Lα from atomic H in the extended energy range (1 0-2000 eV) where cross sections can be related to optical oscillator strengths. A small (~5%) change in the cross section of the most abundant species at low energy (~50eV) is fundamental to all electron energy loss codes.