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Title: High-temperature, high-resolution photoabsorption cross sections of O/sub 2/ in the 108.5-nm region

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Abstract: The high-resolution absorption cross-section measurements of O/sub 2/ in the 108.0- to 108.7-nm spectral region have been carried out with a resolution of 0.0008 nm and at temperatures of 295 and 535 K. The absorption features in this spectral region exhibit primarily a blue-shaded broad band with a band head peaked at 108.52 nm. The center of gravity of the diffuse band is located at 108.452 nm. The present room temperature cross-section data of the N II 108.5-nm sextuplets agree well with the unpublished data of J.A.R. Samson (private communication, 1990). As the temperature increases from 295 to 535 K, we observe a decrease in cross-section values by as much as 30% over the contour of the diffuse band. Similarly, the cross-section values of the sharp features decrease as temperature increases. The N II 108.5-nm multiplets are one of the prominent emissions in the Earth's airglow. The EUV-UV dayglow limb scans of the thermosphere and ionosphere have currently been gathered by satellite, e.g., ARGOS, at a tangent ray height of 200 km, above where the ambient absorption due to O/sub 2/ and N/sub 2/ is expected. The present temperature-dependent cross sections of O/sub 2/ provide the important database required for modeling the dayglow observations.

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