

## A Molecular Nitrogen Model for the Titan Atmosphere

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The development of a new, physically-based, quantum-mechanical model for molecular nitrogen photoabsorption and photodissociation is described, and the model results for three isotopomers are compared with experiment. Advantages of the model include simultaneous computation of the total photodissociation cross section and the branching ratios for dissociation into all energetically-accessible channels, and a seamless treatment of isotopic and temperature effects. Applications of the model in the XUV are of particular relevance to the current encounter of Cassini-Huygens with Titan and initial results have been supplied to the UVIS team for solar-occultation analysis. Quantum-interference effects are found to lead to far-wing line-shape asymmetry not predicted by the simple models. These effects may have a significant bearing on the penetration of solar radiation into nitrogen-rich planetary atmospheres and the consequent photochemistry, including isotopic fractionation.