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Book of Abstracts

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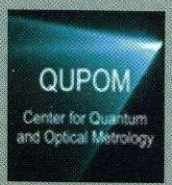

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at the
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Marinković Bratislav **(5)** **Poster**

An experimental study of the excited electronic levels of N_2O molecule by electron energy loss spectroscopy and vacuum ultraviolet absorption

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The nitrous oxide molecule is important in many areas of science and technology including; its role in depletion of the ozone layer; its use as an electron scavenger in radiation chemistry, and its applications in medicine as an anesthetic. Nitrous oxide, as the main natural source of nitric oxides, is also a major greenhouse gas with substantial impact on global warming.

The vacuum ultraviolet absorption spectrum of nitrous oxide (N_2O) molecule has been recorded between 4.13 eV (300 nm) and 11.3 eV (110 nm) and absolute photoabsorption cross sections measured. The electronic excited states of the molecule have also been probed using High Resolution Electron Energy Loss Spectroscopy (HREELS), recorded under electric–dipole conditions. The HREELS data has confirmed the magnitude of the photoabsorption cross section values and extended the optical oscillator strength values up to 14 eV. Measurements at several scattering angles have allowed the angular behavior of differential cross section ratios for some features in the 5–7.1 eV region to be measured, which in turn have helped in the assignments of electronic states to each of the observed absorption bands.

We have alo measured absolute electron differential cross section (DCS) values for the excitation of the 2 $^1\Sigma^+$ and $^1\Pi$ states of N_2O [1] and such electron energy-loss data [2] have been used to derive the Apparent Differential Oscillator-strength (ADOS) distribution for N_2O. Our ADOS data may be compared with the electron impact energy loss spectrum of Jones [3], very good agreement has been found.

Optical spectra were obtained using the Seya monochromator on beam-line 3.1 at the Daresbury Laboratory synchrotron radiation source. The transmitted radiation was normalized to a constant ring current before data analysis using the Beer–Lambert expression. The spectra obtained were compared with the electronic spectra of Chan *et al* [4] who determined associated optical oscillator strengths using low resolution (e, e) spectroscopy and with the absolute photoabsorption cross sections by Shaw *et al* [5].

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