FOURIER TRANSFORM FAR-INFRARED SPECTROSCOPY OF HN_2^+ ON THE AILES BEAMLINE OF SYNCHROTRON SOLEIL

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We report the pure rotation spectrum of HN_2^+ measured by Fourier Transform (FT) absorption spectroscopy in the 20-40 cm^{-1} spectral range. The cations are produced in a liquid nitrogen cooled hollow cathode discharge cell developed on the AILES beamline of synchrotron SOLEIL. The set-up was optimized by recording rotation-vibration spectra of H_3^+(ν_2 band centered at 2521 cm^{-1}), HN_2^+ (ν_1 band centered at 3234 cm^{-1}) and HCO^+(ν_1 band centered at 3089 cm^{-1}). Many rotation-vibration lines have been assigned for each ion and 5 pure rotational transitions have been detected for HN_2^+. These results demonstrate the feasibility to record far-infrared (far-IR) spectra of cationic species using FT broad band spectroscopy associated to the bright synchrotron radiation continuum as an alternative to laser-based frequency tunable techniques. In the presentation, we will describe the experimental set-up, the results obtained and the perspectives of this preliminary work which will rely on the exploitation of intense Coherent Synchrotron Radiation (CSR).

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