
Accurate Einstein coefficients for electric dipole transitions in the first negative band of N2+

Alexander Alijah^{*1}, Olfa Ferchichi^{1,2}, Najoua Derbel², and Philippe Rousselot³

¹GSMA – Centre national de la recherche scientifique (CNRS) Université de Reims
Champagne-Ardenne (Urca) – France

²Laboratoire de Spectroscopie Atomique, Moléculaire et Applications – Tunisie

³UTINAM / OSU THETA – UBFC, Univ Bourgogne Franche-Comte, F- 25000 Besancon, France,
CNRS : UMR6213 – France

Résumé

Context. The N2+ fluorescence spectrum of comet C/2016 R2 is modelled by Rousselot and coworkers (A&A in press). That work relies on accurate Einstein coefficients for electric dipole transitions between the B 2Σu+ and X 2Σg+ electronic states of N2+ .

Aims. These coefficients are provided in the present paper.

Methods. The potential energy curves and transition dipole moments were computed at a high level of ab initio theory and include relativistic corrections. Rovibrational wavefunctions were then obtained without assuming separability of vibrational and rotational motions.

Results. Vibrationally and rotationally resolved Einstein coefficients are presented in a convenient three-parameter functional form for three isotopologues. A possible explanation is given for the large variation in the experimental radiative lifetimes.

^{*}Intervenant