Abstract Submitted
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Orientation and alignment of excited molecular photoions from the polarization of their fluorescence[1] ALBERTO GONZALEZ-CASTRILLO, ROBERT LUCCHESE, Texas A and M University — We examine the fluorescence of the photoionized nitrogen molecule, with linearly- and circularly-polarized incident light: $N_2(X^1\Sigma_g^+)+\gamma \rightarrow N_2^+(B^2\Sigma_u^+, J')+e^-(\epsilon\pi_g, \epsilon\sigma_g) \rightarrow N_2^+(X^2\Sigma_g^+, J'')+\gamma'$. First, we compute the rotational specific transition as a function of the molecular orientation and the incident light polarization. Then, we investigate the fluorescence process from the intermediate molecular photoion reached in the first step, focusing on the dependence of the fluorescence intensity with the polarization parameters of both incident and emitted light. The computed fluorescence intensity, as a function of its polarization parameters, is compared to the experimental results obtained by J. E. Furst *et al.* Both experimental and theoretical results show that the residual molecular photoion, $N_2^+(X^2\Sigma_g^+, J'')$, is oriented and this is generally opposite to the direction reached in the simple excitation of the N_2 by the absorption of circularly-polarized light. This clearly indicates that the ejected electron in the ionization process carries away most of the free angular momentum in the collision.

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