EXPERIMENTAL MAPPING OF THE ABSOLUTE VALUE OF THE ELECTRONIC TRANSITION DIPOLE MOMENT FUNCTION $\mu_e(R)$ OF THE $Na_2$ $A^1\Sigma_u^+ - X^1\Sigma_g^+$ SYSTEM

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The absolute value of the transition dipole moment function $\mu_e(R)$ of the $A^1\Sigma_u^+ - X^1\Sigma_g^+$ band of $Na_2$ was mapped experimentally within a relatively large range of internuclear distance R. The transition dipole moment matrix element of a set of rovibrational transitions between the $A^1\Sigma_u^+$ and $X^1\Sigma_g^+$ states was measured using the Autler-Townes (AT) effect[a]. By employing the R-centroid approximation, or a fit with a polynomial function involving the higher R-moments, $\mu_e$ as function of the internuclear distance was constructed. The AT effect based measurements give the absolute value of $\mu_e$ which can be used to "normalize" the transition dipole moment functions $\mu_e(R)$ obtained with other experimental techniques, such as line intensity based measurements, which in general give only the relative behavior of $\mu_e(R)$.

[a]E. Ahmed et al. J. Chem. Phys. 124, 084308 (2006)