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# Dynamics of the photodissociation of methylamine: H and CH3 displacement channels

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Due to its similarity with ammonia ($NH_3$) and because it has been observed in the interstellar medium,[1] methylamine ($CH_3NH_2$) has received considerable attention in the last decades. The molecular photodissociation of methylamine was studied using the pump-probe method with nanosecond laser pulses. The molecule was excited in the $198 - 203$ nm range, and the generated photofragments were detected with the velocity map imaging (VMI) technique, studying the H-atom elimination and the N−C bond fission channels separately, combining experiment and theory.
On the one hand, the H-atom displacement channel presents two main dissociation pathways. One is attributed to the formation of $CH_3NH(X)$ via a conical intersection (CI),[2,3], while the other to $CH_3NH(A)$, observed for the first time. On the other hand, the recorded images for the $NH_2 + CH_3$ channel show unstructured Boltzmann-type distributions; however, the speed-dependent anisotropy parameters reveal the presence of two dissociation mechanisms. With a similar landscape of the computed potential energy curves to the N−H bond fission, prompt dissociation of the C−N bond through the CI is proposed as a minor channel. In contrast, the kinetic energy distribution reflects a major slow dissociation in the ground state, which can arise from frustrated N-H bond cleavage trajectories or vibrationally-hot ground state $NH_2$ fragments.

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