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Observing the non-adiabatic photodissociation of neutral excited CH_3OH with few-femtosecond sensitivity ELIO CHAMPENOIS, LOREN GREENMAN, NIRANJAN SHIVARAM, KIRK LARSEN, ALI BELKACEM, Lawrence Berkeley National Laboratory — The ultrafast dissociation dynamics of neutral excited methanol (CH_3OH) have been explored using time-resolved photoelectron imaging and excited state potential energy surface calculations. Nuclear motions on the initially populated 2 ^{1}A" (S2) state, through a region of strong non-adiabatic coupling, and on a dissociative state are resolved within the first 15 femtoseconds following excitation. A CH_3 hydrogen-loss channel is also observed and found to depend more strongly on OH rather than CH_3 deuteration. The measurements and calculations indicate that the previously ignored 1 ^{1}A' (S3) state, rather than the 1 ^{1}A" (S1) state, plays an important role in these dynamics.

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