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Calculation of Ionization in Direct Frequency Comb Spectroscopy BACHANA LOMSADZE, CHARLES FEHRENBACH, BRETT DEPAOLA, Kansas State University — Direct Frequency Comb Spectroscopy (DFCS) is currently the most precise technique known for measuring the structure of atomic and molecular systems. Usually in DFCS one measures the fluorescence signal coming from the excited states of the target system as a function of the laser's repetition frequency (f_{rep}) or offset (f_{off}) frequency. In recent years this process also has been thoroughly modeled theoretically. Although subsequent ionization of the excited states by the comb laser is possible, it has not been considered, either in theory or in experiment. The goal for this work was to expand existing computer code to include photoionization. Our calculations for atomic Rb show that the ion yield is comparable to fluorescence. Furthermore, the ionization spectrum, as a function of f_{rep} or f_{off}, replicates the structure of the corresponding fluorescence spectrum. Experimentally, this could be useful because ion detection efficiency is generally very high. We have constructed an apparatus to test the theoretical predictions. We show the results of our calculations and our measurements.

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