TWO-PHOTON TRANSITIONS VIA OPTICAL FREQUENCY COMB TO FORM ULTRACOLD MOLECULES

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We show that a single femtosecond optical frequency comb may be used to induce two-photon transitions between molecular vibrational levels to form ultracold molecules, e.g., KRb. The phase across an individual pulse in the pulse train is sinusoidally modulated with a carefully chosen amplitude and modulation frequency. Piecewise adiabatic population transfer is fulfilled to the final state by each pulse in the applied pulse train providing a controlled population accumulation in the final state. Similar results are obtained using a standard optical frequency comb with zero carrier-envelop-offset frequency.