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Control of Spectral Interference Patterns in Broad Rabi Sidebands: Terahertz Quasi-Comb Structures[1] DMITRI ROMANOV, Department of Physics and Center for Advanced Photonics Research, Temple University, ALEX FILIN, ROBERT LEVIS, Department of Chemistry and Center for Advanced Photonics Research, Temple University — Coherent broadband radiation in the form of Rabi sidebands with an effective bandwidth $\sim$ 200 meV is generated in atmospheric-pressure gases in pump-probe experiments. The dynamic Rabi sidebands show characteristic fringe patterns of spatial-spectral interference, whose variable contrast is affected by decoherence processes. The spectrum envelope, the fringe contrast, and the fringe spacing variation in these patterns can be controlled by the intensity and shape of the probe pulse. We demonstrate such control experimentally and report analytic and numerical investigation of possibilities to produce a comb-like fringe structure. The sideband envelope is mainly determined by the sharpness of the driving probe pulse. The fringe contrast, defined by the maximum-to-minimum difference, depends strongly on the asymmetry of the driving pulse. The variation of inter-peak distance within a sideband was controlled using the temporal shape of the driving pulse. In a particular case of blue-shifted sideband emitted by excited oxygen atoms driven by a picosecond pulse of 800 nm carrier wavelength and $\sim$ 0.05 TW/ cm^2 intensity, a super-Gaussian pulse shape leads to almost equidistant fringes producing a comb-like spectrum over the interval from 1.60 to 1.66 eV.

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