Abstracts

Step-Tunable Far Infrared Radiation by Phase Matched Mixing in Planar-Dielectric Waveguides

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The mixing of various pairs of CO/sub 2/ laser lines in a nonlinear material can produce thousands of step-tunable far infrared (FIR) signals in the range 70-μm-7-mm wavelength with frequency spacings of less than 0.1 cm/sup -1/. The major problem in realizing these coherent signals is achieving phase matching in a suitable nonlinear material. In this paper, the interest is in generating tunable signals at the milliwatt level in a planar-dielectric integrated-optics waveguide configuration. Phase matching can be achieved with cubic materials (i.e., GaAs) by adding the waveguide dispersion to the bulk dispersion. Work on the analysis of the waveguide mixing system and its correlation with experimental data are described for a planar GaAs dielectric waveguide in the 100-1000-μm wavelength range.

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