

Nonlinear Harmonic Generation and Devices in Multi-resonant Cavities

Technology #13255

Applications

This technology has applications in optical clocks, modulator/demodulators, spectroscopy, ultrafast signal processing, high-speed data transmission, digital radar, tomography, and other applications.

Problem Addressed

Efficient nonlinear frequency conversion in waveguides is often hard to achieve because as the input power increases the frequency conversion eventually saturates due to competition between up and down conversion. Therefore, there is a need for optimized harmonic conversion in waveguides.

Technology

The invention is a nonlinear harmonic generation system which includes a waveguide channel that receives and propagates electromagnetic signals. In this system, a resonant cavity is coupled to the waveguide channel. This resonant cavity structure includes a plurality of resonant modes into which electromagnetic energy is coupled throughout the operation of the system. This double resonant cavity significantly reduces the required power for the efficient harmonic generation.

Advantages

- High-efficiency harmonic conversion solutions with low input power
- Exhibits a rich variety of nonlinear dynamics (potentially forming optical "clocks" in the GHz-THz regime)

Categories For This Invention:

Photonics

Other (Photonics)

Sensors (Photonics)

Spectroscopy (Sensors)

Intellectual Property:

Nonlinear harmonic generation and devices in doubly-resonant kerr cavities

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The Nanophotonics Theory and Computation Group

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