MICROWAVE SPECTRA OF STIMULATED PHONON EMISSION IN AN ACOUSTIC QUANTUM GENERATOR (PHASER) WITH MODULATED PUMP

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S u m m a r y

Two qualitatively different types of the evolution of phonon microwave spectra in a ruby phaser have been experimentally revealed under conditions of periodic forcing of the spin-system inversion. At a deep pump modulation in the frequency range $\omega_m = 70 \div 300$ Hz, the fast chaotic alteration of microwave phonon stimulated emission (SE) modes is the main type of phaser generation. But, for the modulation frequencies about $\omega_m = 10$ Hz, the regular, much more slow processes of phonon SE spectra rebuilding were observed by us at the same set of another phaser control parameters. This second type the phonon SE dynamics manifests itself as the highly-organized collective spectral motions with the period, which strongly depends on the modulation frequency and changes by several orders if ω_m is varying in a narrow range ($\pm$ 5%). A theoretical model based on the antiphase mechanism of intermode energy exchange in nonequilibrium systems is proposed for interpretation of this unusual type of microwave acoustic quantum generation.