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**Narrow spectral peaks induced by phase noise in modulated oscillators** MARK DYKMAN, YAXING ZHANG, Michigan State University, J. MOSER, A. EICHLER, A. BACHTOLD, Institut de Ciencies Fotoniques — We show that frequency noise leads to additional peaks in the power spectra of modulated vibrational systems. We also provide experimental evidence of the occurrence of such peaks in suspended carbon nanotubes. The peaks are shown to emerge even for linear vibrations, in which case their parameters are independent of the thermal noise that accompanies relaxation. They can be thought of as a result of weakly inelastic scattering of the modulating field due to frequency noise. The peaks are centered near the modulation frequency and near the oscillator eigenfrequency, with strengths that depend on the noise spectrum. The peak near the modulation frequency is determined by the low-frequency part of the noise spectrum and can be much narrower than the peak in the oscillator absorption spectrum. We also show that the vibration nonlinearity can lead to a characteristic extra structure in the power spectrum in the presence of modulation. The modulation-induced spectral peaks are not only a direct indicator of frequency fluctuations, but they also provide information about the fluctuation intensity and spectrum thus enabling full characterization of the fluctuations.

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