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Regenerative Pulsations in Optomechanical Devices HUGH RAMP, MOHAMMAD BITARAFAN, BRAD HAUER, XAVIER ROJAS, RAY DECORBY, JOHN DAVIS, Univ of Alberta — In optomechanical devices, the presence of a strong cavity optical field is often desired to observe mechanical motion. In this case it becomes important to consider the effects of non-linear optical processes occurring in the device medium, which alter the effective refractive index and absorption coefficient of the device. We study the example of the buckled-dome Fabry-Perot microcavity, in which light is trapped in a spherical cap formed by two Si-SiO_2 Bragg mirrors of radius 125 μm. In the presence of strong optical fields the silicon in these devices undergo a combination of $\chi^{(3)}$ non-linear processes resulting in periodic shifts of the cavity optical resonance known as regenerative pulsations. We have found that the precise waveform and frequency of these pulsations can be tuned by altering the laser detuning and input power, and found that the study of the pulsations leads to interesting observations of the optical, thermal, and mechanical properties of the device.

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