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Influence of cavity optomechanics on Kerr frequency combs RYO SUZUKI, AKITOSHI JINNAI, TAKUMA NAGANO, TOMOYA KOBATAKE, TAKUMI KATO, TAKASUMI TANABE, Keio University — The Kerr frequency comb has the potential for applications in, for example, spectroscopy, optical communication, waveform shaping and astronomy. Recently, the mechanism of soliton pulse generation in a microcavity has been studied numerically and experimentally. Silicon nitride ring and magnesium fluoride microcavities are commonly used in experimental research, because of their high nonlinearity, dispersion and other advantageous characteristics. On the other hand, silica toroid microcavities are not much used for Kerr comb research in the time domain (e. g. pulse generation/measurement). This is because toroid microcavities are prone to cavity optomechanical vibration, and the cavity dispersion of the fundamental mode of a small radius microcavity is normal. To fabricate a toroid microcavity with a large radius, we need to use a particular fabrication process. In this research, by controlling the detuning of the resonance and pump laser frequencies, we suppressed the noise of optomechanical vibration and obtained pulses with low background noise using higher order resonance modes. In addition, we observed optical pulses with repetition frequencies of up to 3.7 THz.

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