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Resonant photonic oscillators and regenerative frequency dividers

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Mode-locked Kerr frequency combs generated in nonlinear resonators pumped with coherent monochromatic light have attracted significant attention because of their practical importance associated with their applications in optical and microwave frequency generation, signal synthesis, clocks and others. Dichromatic resonant continuous wave pumping of a nonlinear optical resonator can result in generation of broad microcombs at low power levels as well as other comb structures different from the usual Kerr combs. These frequency combs can be fully stabilized by means of pump harmonics and the repetition rate of the microcombs can be significantly smaller than the frequency difference between the pump frequencies. These combs can be considered as realizations of large order discrete time crystals and can be used as regenerative photonic frequency dividers. In this presentation we will discuss properties and applications of the optical frequency combs generated in cavities by means of dichromatic light.

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