Progress in Cherenkov femtosecond fiber lasers - DTU Orbit (08/11/2017)

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We review the recent developments in the field of ultrafast Cherenkov fiber lasers. Two essential properties of such laser systems—broad wavelength tunability and high efficiency of Cherenkov radiation wavelength conversion are discussed. The exceptional performance of the Cherenkov fiber laser systems are highlighted—dependent on the realization scheme, the Cherenkov lasers can generate the femtosecond output tunable across the entire visible and even the UV range, and for certain designs more than 40% conversion efficiency from the pump to Cherenkov signal can be achieved. The femtosecond Cherenkov laser with all-fiber architecture is presented and discussed. Operating in the visible range, it delivers 100–200 fs wavelength-tunable pulses with multimilliwatt output power and exceptionally low noise figure an order of magnitude lower than the traditional wavelength tunable supercontinuumbased femtosecond sources. The applications for Cherenkov laser systems in practical biophotonics and biomedical applications, such as bio-imaging and microscopy, are discussed.

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