Singly-resonant sum frequency generation of visible light in a semiconductor disk laser

In this paper a generic approach for visible light generation is presented. It is based on sum frequency generation between a semiconductor disk laser and a solid-state laser, where the frequency mixing is achieved within the cavity of the semiconductor disk laser using a singlepass of the solid-state laser light. This exploits the good beam quality and high intra-cavity power present in the semiconductor disk laser to achieve high conversion efficiency. Combining sum frequency mixing and semiconductor disk lasers in this manner allows in principle for generation of any wavelength within the visible spectrum, by appropriate choice of semiconductor material and single-pass laser wavelength.