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New wavelengths generation in T-cavity vertical-external-cavity surface-emitting lasers

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Vertical external cavity surface emitting lasers (VECSEL) are proven to be reliable sources of multi-watts, high-brightness emission in a wide range of fundamental operating wavelengths. InGaAs/GaAs strained quantum well VECSELs have been shown for cw, TEM00 output power of tens of watts, spanning a wavelength range of ~900 nm to ~1200 nm. A unique advantage of VECSELs is the ability to access the intra-cavity circulating power that can allow new functionalities such as wavelength tuning and efficient nonlinear conversion. The possibility of generating high-power two-wavelength emission allows the generation of new wavelengths by nonlinear sum frequency generation (SFG) or difference frequency generation (DFG), allowing new wavelength sources in the range of UV to mid- and far IR. Using a novel two-chip T-cavity VECSEL we have successfully demonstrated tunable, multi-watts, coaxial, two-color VECSELs with tunable wavelengths separation anywhere in the range of 0-200 nm. This can allow the generation of efficient high power sources in a very broad wavelength range that are generally very hard to achieve. In this talk our approach and recent results in generating multi-watts two-wavelength will be presented. New wavelengths generation by SFG or DFG will then be presented and potential applications will be described.

Biography

Mahmoud Fallahi is a Professor at the College of Optical Sciences, University of Arizona. He received his BS degree from the University of Dijon, and his MS and PhD degrees from the University of Toulouse and LAAS-CNRS, France. He joined the National Research Council of Canada as a Post-doctoral Research Associate in 1989 and became a member of technical staff in 1992. He joined the Optical Sciences Center at University of Arizona in 1995. He became Associate Professor in 2000 and Professor in 2006. He has served as the Conference Chair and Program Committee member in several international conferences.

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