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Thermal management of VECSEL-GaAs for high-power single-mode emission

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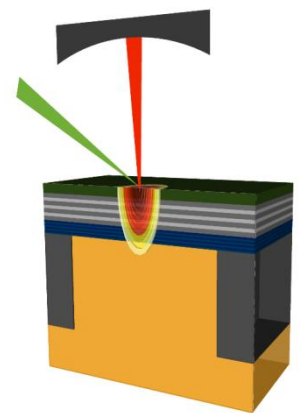
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Information and communication technologies have revolutionized our world and reshaped our industries. Vertical emission in external cavity lasers (VECSEL) combine simultaneously high-power and highly coherent tunable single-frequency laser emission. VECSELS are promising candidates for various applications such as transmitter, sensors.

In our study, we are interested in reducing the thermal impedance of our $\frac{1}{2}$ VECSELS on GaAs substrate, emitting between 800 and 1100nm. Part of the power of the optical pump is converted into a significant heating of the component. This heating reduces the gain of the QWs and induces a shift of the emission wavelength towards longer wavelengths [1]. In the literature, many strategies to improve the heat dissipation for $\frac{1}{2}$ VECSEL are proposed [2][3]. In our case, our approach is to integrate a heat sink as close as possible to the Bragg mirror by dry etching and electrolytic metal growth. As a first step, we studied both the diameter of the aperture and the metal material to be used in order to have a good mechanical stability of the semiconductor structure while ensuring very good heat dissipation



Integrated heat sink on VECSEL

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[3] G. Hou et al. IEEE Photonics Journal, Volume 11, Number 2, April 2019

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*Check the 17 sustainable development goals on the United Nations website:

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