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## Athermalization and on-chip multi-wavelength integration of VCSELs employing thermally actuated micromachined mirrors

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### Abstract

An athermal multi-wavelength vertical cavity surface emitting laser (VCSEL) array is demonstrated using a thermally actuated cantilever structure with different cantilever lengths. The cavity length of each VCSEL is precisely controlled via the deflection of the cantilever due to difference in the lattice constant of GaAlAs layers. Also, the thermally induced actuation of the cantilever reduces the cavity length as the ambient temperature increases, which compensates the thermal wavelength drift of the VCSEL. The wavelength drift could be reduced within  $\pm 0.017$  nm/K, which is 4 times smaller than that of conventional VCSELs. The proposed multi-wavelength VCSEL array enables four wavelength channels with 2.5 nm spacing under uncooled operations. (C) 2014 AIP Publishing LLC.

### Keywords

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