Conclusions

• Lateral leakage and diffraction losses, and thus threshold material gain, strongly depend on design of transverse current confinement scheme.
• A “negative” physical step translated into the top DBR (which exists in many GaN-based VCSEL designs) ⇒ optical anti-guiding and high threshold gain.
• Close to zero index guiding ⇒ dramatic changes in threshold material gain (from 6000 cm⁻¹ to 2000 cm⁻¹)
• By small modification, an index-guided structure with low threshold gain can be achieved, with similar index guiding as a standard oxide-confined 850-nm GaAs-based VCSEL.

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