High beta lasing in micropillar cavities with adiabatic layer design

We report on lasing in optically pumped adiabatic micropillar cavities, based on the AlAs/GaAs material system. A detailed study of the threshold pump power and the spontaneous emission β factor in the lasing regime for different diameters dc is presented. We demonstrate a reduction of the threshold pump power by over 2 orders of magnitude from dc = 2.25 μm down to 0.95 μm. Lasing with β factors exceeding 0.5 shows that adiabatic micropillars are operating deeply in the cavity quantum electrodynamics regime.

General information
Publication status: Published
Organisations: Department of Photonics Engineering, Quantum and Laser Photonics, Universität Würzburg, University of Bremen
Pages: 052114
Publication date: 2013
Peer-reviewed: Yes

Publication information
Volume: 102
Issue number: 5
ISSN (Print): 0003-6951
Ratings:
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.77 SJR 2.146 SNIP 1.634
Web of Science (2013): Impact factor 3.515
Web of Science (2013): Indexed yes
Original language: English
Electronic versions:
prod21361378889990.Lermer_13_High_beta_lasing_in_micropillar_cavities_with_adiabatic_layer_design.pdf
DOIs: 10.1063/1.4791563

Bibliographical note
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Source: dtu
Source ID: n:oai:DTIC-ART:swets/379743730::26438
Research output: Contribution to journal > Journal article – Annual report year: 2013 > Research > peer-review