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 $\beta$ factor in the lasing regime for different diameters $d_c$ is presented. We demonstrate a reduction of the threshold pump power by over 2 orders of magnitude from $d_c=2.25\,\mu m$ down to $0.95\,\mu m$. Lasing with $\beta$ factors exceeding 0.5 shows that adiabatic micropillars are operating deeply in the cavity quantum electrodynamics regime.

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