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=2.25μm down to 0.95μm. Lasing with β factors exceeding 0.5 shows that adiabatic micropillars are operating deeply in the cavity quantum electrodynamics regime.

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