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Gain-induced trapping of microcavity exciton polariton condensates GEORGIOS ROUMPOS, WOLFGANG H. NITSCHKE, Stanford University, CA, USA, SVEN HÖFLING, ALFRED FORCHEL, University of Wuerzburg, Germany, YOSHIHISA YAMAMOTO, Stanford University, CA, USA and National Institute of Informatics, Japan — We have performed real and momentum space spectroscopy of exciton polariton condensates in a GaAs-based microcavity under non-resonant excitation with an intensity stabilized laser. An effective trapping mechanism is revealed, which is due to the stimulated scattering gain inside the finite excitation spot combined with the short lifetime. We observe several quantized modes without any externally applied potential, while the lowest state with macroscopic population shows Heisenberg-limited real and momentum space distributions. The experimental findings are qualitatively reproduced by an open dissipative Gross-Pitaevskii equation model including loss and gain terms.

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