Bose-Einstein condensates in semiconductor microcavities

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Following the observation of Bose-Einstein condensation of cavity exciton-polaritons, important advances have been obtained towards the realization of polariton-condensates based devices. I will present, as an example, the realization of an all-optical device controlling polariton condensates in confined geometries, demonstrating the realization of a novel transistor switche mediated by propagating Bose-Einstein polariton condensates in a quasi-1D semiconductor microcavity ridge.
These systems also provide an unparalleled scenario to study fundamental quantum mechanical questions as, for example, those related with the coherence of condensates.

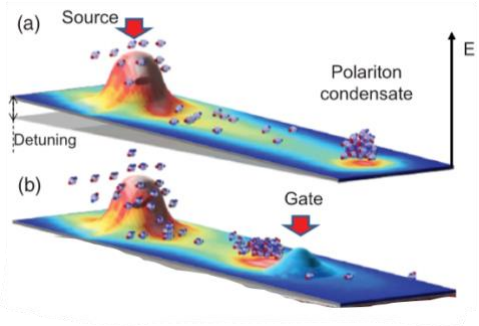

Fig.1. Scheme of a transistor based on a polariton condensate in a microcavity ridge (a) without and (b) with the gate.

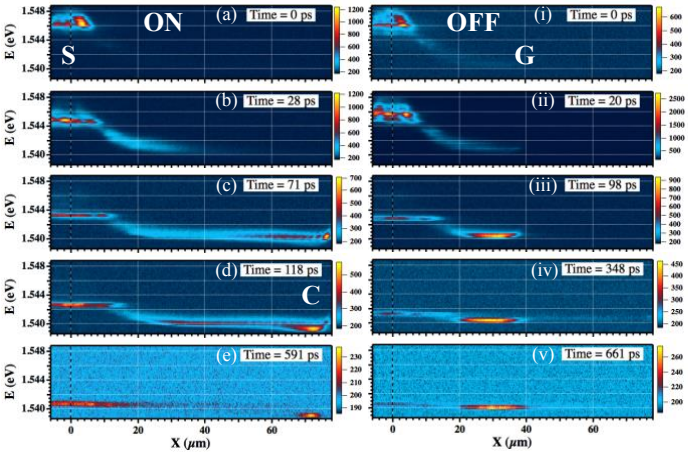

Figure 2. (a-e)/(i-v) Polariton emission in energy vs. position maps for the ON/OFF transistor state. The snapshots are taken at the times shown. The intensity is coded in a false color scale