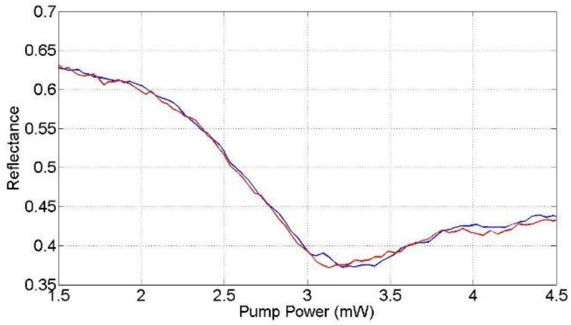
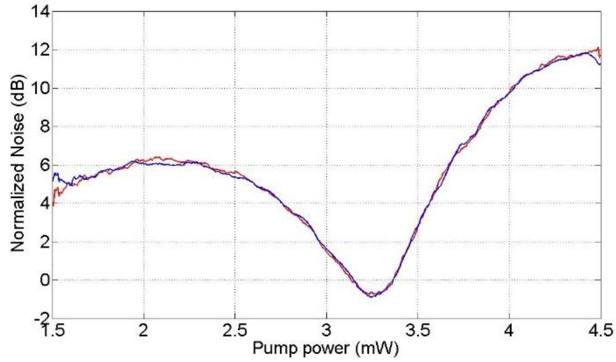
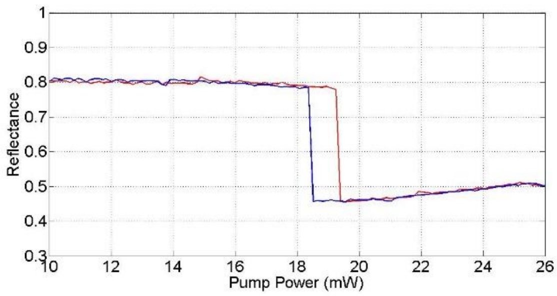


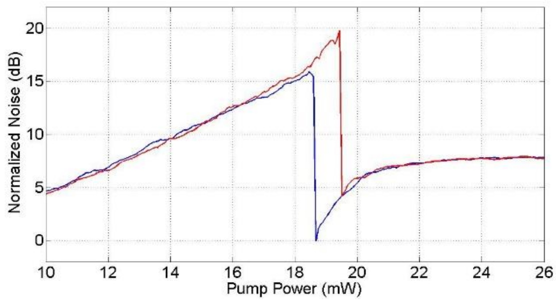
Supplementary Figure 1: Reflectance at low detuning. Reflectance as a function of the pump power for a pump-polariton detuning of 0.10meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it. The pump-polariton detuning is too low to observe any bistable behavior.



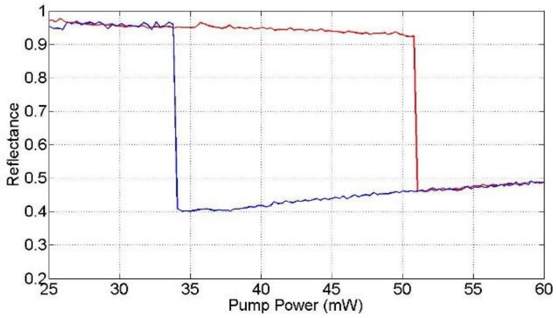
Supplementary Figure 2: Noise at low detuning. Intensity noise as a function of the pump power for a pump-polariton detuning of 0.10meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it. The squeezing here is about 0.8dB (17% below the shot noise).



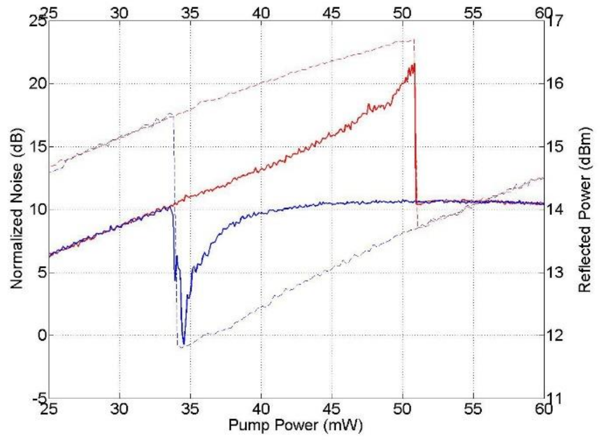
Supplementary Figure 3: Reflectance at medium detuning. Reflectance as a function of the pump power for a pump-polariton detuning of 0.21meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it. The detuning is high enough to show a bistable behavior.



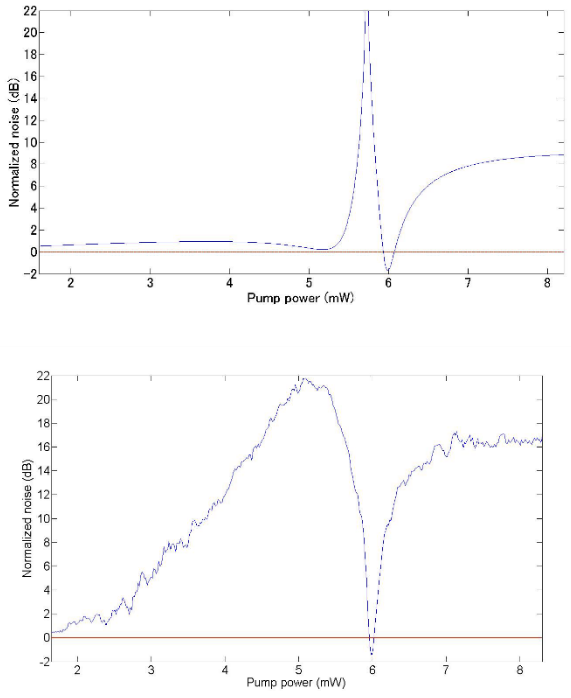
Supplementary Figure 4: Noise at medium detuning. Intensity noise as a function of the pump power for a pump-polariton detuning of 0.21meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it. The hysteresis cycle is also present.



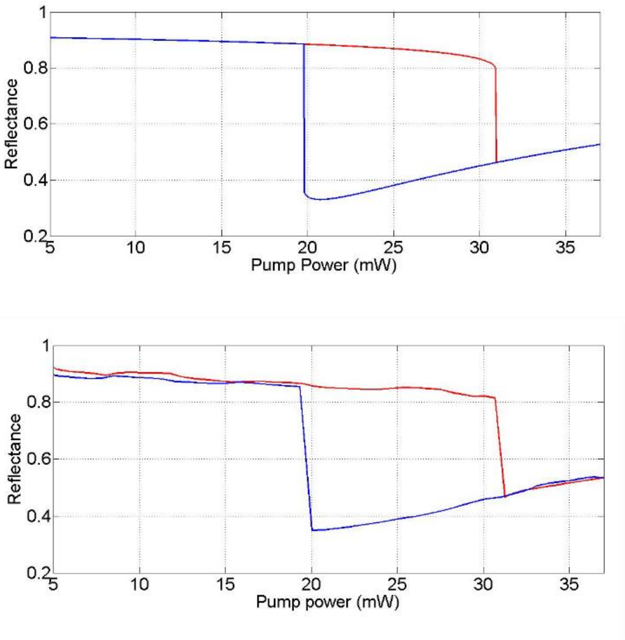
Supplementary Figure 5: Reflectance at high detuning. Reflectance as a function of the pump power for a pump-polariton detuning of 0.30meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it.



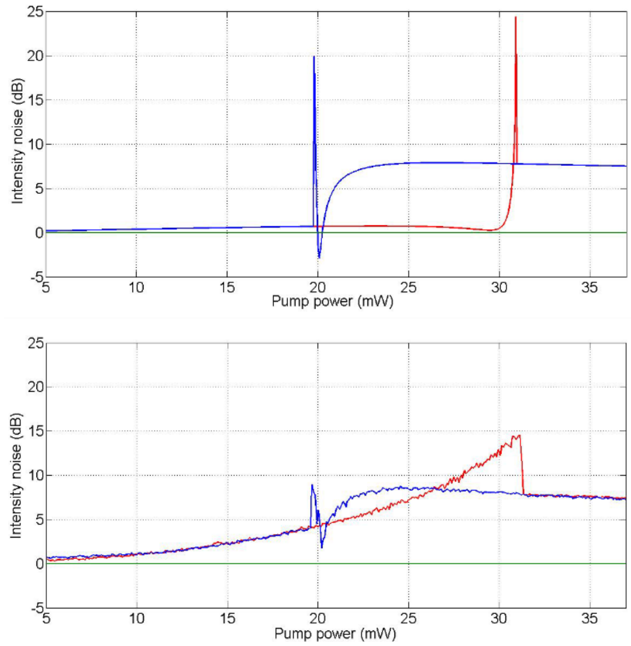
Supplementary Figure 6: Noise at high detuning. Intensity noise (thick lines) and reflected power (dashed lines) as a function of the pump power for a pump-polariton detuning of 0.30meV. The pillar is 6µm of diameter and the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it.



Supplementary Figure 7: Theory vs. experiment, noise at low detuning. Theoretical (top) and experimental (bottom) plots for the intensity noise of the collected light as a function of the pump power, for a pump-polariton detuning $\Delta = 0.15$meV and a cavity-exciton detuning of $\delta = -5$meV on a 6µm round pillar. The scan direction is from higher to lower power.



Supplementary Figure 8: Theory vs. experiment, reflectance at high detuning. Theoretical (top) and experimental (bottom) plots for the reflectance as a function of the pump power for a pump-polariton detuning of 0.26meV. The red line is the obtained by increasing pump power and the blue line by decreasing it.



Supplementary Figure 9: Theory vs. experiment, noise at high detuning. Theoretical (top) and experimental (bottom) plots for the intensity noise as a function of the pump power for a laser-polariton detuning of 0.26meV. The measured pillar has a diameter of 6µm, while the cavity detuning is $\delta = -5$meV. The red line is obtained by increasing pump power and the blue line by decreasing it.

Supplementary Note 1: Effect of the pump-polariton detuning. The main experimental parameter impacting the bistability figure of the reflectance is Δ, the polariton-laser detuning. The bistability turning points are where the intensity noise decreases rapidly, and the bistability figure is hence of great interest to find the region of intensity squeezing as well as to fit the model onto the precise experimental characteristics of the sample. Measurements were done for different value of Δ on the same pillar, between 0.10meV and 0.30meV. We found, as expected from previous studies [1, 2], that an actual bistable behavior is only present above some critical value of Δ. In our sample this critical detuning is about 0.19meV. Below this value the absence of bistability means that the noise versus pump power curves are identical whether increasing or decreasing the pump power with time. Above this critical value a bistable behavior can be observed in the reflectance as well as in the noise.

For $\Delta < 0.19$meV, no bistable behavior can be observed but nonlinear characteristics are present. Under this condition there is no sharp threshold and the nonlinear behavior is visible through a smooth deforming of the reflectance (see Supplementary Fig. 1), the lower is Δ the smoother is the behavior. This is mirrored in the intensity noise versus pump power plots: whether increasing or decreasing the pump power there is no sharp transition and the behavior is the same, but a clear deformation due to nonlinearities is present, as shown in Supplementary Fig. 2 for $\Delta = 0.10$meV.

For a detuning above 0.20meV a hysteresis cycle is present both in the reflectance and in the intensity noise. The thresholds are well visible in the noise as an abrupt drop and happen at the same pump power as the bistability thresholds for a fixed Δ. In this regime increasing or decreasing the pump power leads to different noise behaviors and only at the threshold reached by decreasing the pump power (lower threshold) can squeezing be observed. Supplementary Fig. 3 and Supplementary Fig. 4 show, respectively, the reflectance and the noise plots obtained for $\Delta = 0.21$meV while Supplementary Fig. 5 and Supplementary Fig. 6 show, respectively, the reflectance and the noise plots obtained for $\Delta = 0.30$meV.

The region where squeezing occurs gets increasingly narrower with higher Δ, making the detection more and more sensitive to external fluctuations (mechanical and thermal noises, low frequency laser fluctuations). This, in addition to the fact that these fluctuations make the near-threshold region unstable, explains why we found harder to measure squeezing for high values of Δ.

Supplementary References

[1] Karr, J.Ph., Baas, A., Houdre, R. and Giacobino, E., Squeezing in semiconductor microcavities in the strong coupling regime. *Phys. Rev. A* **69,** 031802–031806, (2004).

[2] Baas, A., Karr, J.Ph., Eleuch, H. and Giacobino, E., Optical bistability in semiconductor microcavities. *Phys. Rev. A* **69,** 023809–023817, (2004).