Gallium antimonide quantum dot growth by molecular beam epitaxy

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Single-photon sources based on quantum dots (QDs) emitting in the low-loss telecom bands are very attractive for coupling to fiber networks [1–2]. In addition, quantum communication protocols rely heavily on a long-lived spin of the charge carriers in a QD, for instance, in generation of quantum cluster state [3] and as memory in building quantum repeaters [4]. QD single-photon sources are mostly based on indium arsenide (InAs) QDs [5]–[8], however the longest spin coherence times have been demonstrated in indium-free QDs emitting at 785 nm [9]. Gallium antimonide (GaSb) based QDs, seem to offer an attractive solution as they emit in the telecom-S band [10–11] as their indium-free composition suggest the potential for long spin coherence times. To study the fundamental properties of such GaSb QDs, we use local droplet etching method to grow them. In this poster presentation, we show our latest efforts in this direction by means of transmission electron microscopy, atomic force microscopy, and optical spectroscopy.

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