Towards an integrated squeezed light source

Since its first generation more than 30 years ago, squeezed light has developed towards a tool for high precision measurements as well as a tool for quantum information tasks like quantum key distribution. Miniaturization of sensors is an active field of research with the prospect of many applications. The precision of optical sensors based on interferometric measurements is often limited by the fundamental shot noise. While shot noise can be reduced by increasing the employed light power, integrated sensors pose limitations on the maximum possible amount due to damaging effects of high intensity as well as power consumption. Bright quadrature squeezed light produced by the optical Kerr effect in a nonlinear medium offers an opportunity to overcome these limitations. Here, we present first steps towards a bright quadrature squeezed light source produced by the optical Kerr effect in race-track resonators in silicon nitride by presenting characterizations of the chip. Using standard fabrication techniques this source will have the potential of seamless integration into on-chip optical sensors.