

Laser writing of color centers and optofluidics in synthetic diamond for quantum technologies

Istituto di fotonica e nanotecnologie, CNR Milano

Integrated photonic circuits pave the way for next generation technologies for quantum information and sensing applications. Femtosecond laser writing has emerged as a valuable technique for fabricating such devices when combined with diamond's properties and its nitrogen vacancy color center. Such color centers are fundamental for quantum information and sensing, being possible to excite them and read them out optically through the fabrication of optical waveguides in the bulk of diamond. Diamond is also compelling for microfluidic applications due to its biocompatibility, with sensing functionality provided by NVs. We show how to integrate different building blocks in diamond, to develop proof-of-concept devices with unprecedented electric and magnetic field sensitivities.