Development of compact, robust laser systems for atomic quantum sensing applications

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Fraunhofer Centre of Applied Photonics (CAP), a not-for-profit research and technology organisation based in Glasgow, Scotland has been active in the commercialisation of quantum technologies, including sensing with atoms, for nearly a decade. In this talk we will present an overview of our activities in this area, highlighting our capabilities in designing and building compact, robust laser sources, laser systems and associated electronics as well as optical design, that can be leveraged by the community. We have decades of experience in engineering high performance lasers and laser systems of many types (ECDL, DBR/DFB, VCSEL, DPSS, SDL...) for a wide range of wavelengths and requirements. Here we will discuss a few selected example systems and applications that will be of particular relevance to sensing with warm atomic vapours. These examples include robust laser systems that have successfully operated in a variety of complex environments, MEMS vapour cell characterisation, and using ultrafast laser inscription (ULI) to create a variety of useful structures in transparent substrates.

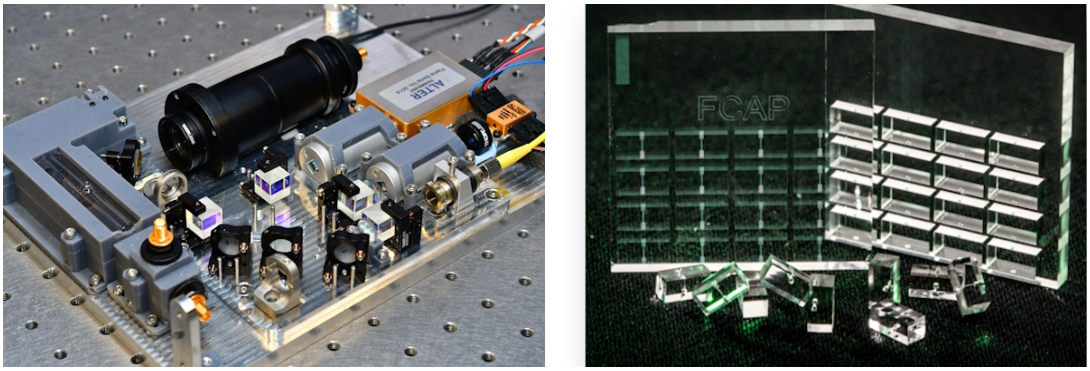

Figure 1. Left: a laser system developed at Fraunhofer CAP for Rydberg atom excitation. Right: a variety of ULI inscribed and etched structures in glass.