**Tailoring the refractive index of films during pulsed laser deposition growth**

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**Abstract:** Pulsed laser deposition (PLD) enables the epitaxial growth of crystalline films using material transfer, from a target to a substrate, via a plasma-plume created during laser ablation. Owing to the several experimental controls available in PLD, which can be adjusted during deposition, this is an excellent tool for growing designer films through altering film parameters such as stoichiometry, crystallinity and thickness [1, 2].

We will present the effects on the refractive index of thin garnet films grown via PLD when varying the temperature of the substrate, onto which the films are grown. Our results show that monotonic control of the YGG refractive index with substrate temperature is possible whilst maintaining good crystal properties. It was observed that at higher substrate temperatures, the gallium content in the crystal is reducing, supported by EDX and XRD measurements, which leads to a decrease in the refractive index of the film. This technique can therefore be used for the fabrication of advanced devices with bespoke refractive index profiles and engineered dielectric properties of composite materials.

1. J. A. Grant-Jacob et al. Opt. Mater. Express 6, 91-96 (2016)
2. T. L. Parsonage et al. Opt. Express 23, 31691-31697 (2015)