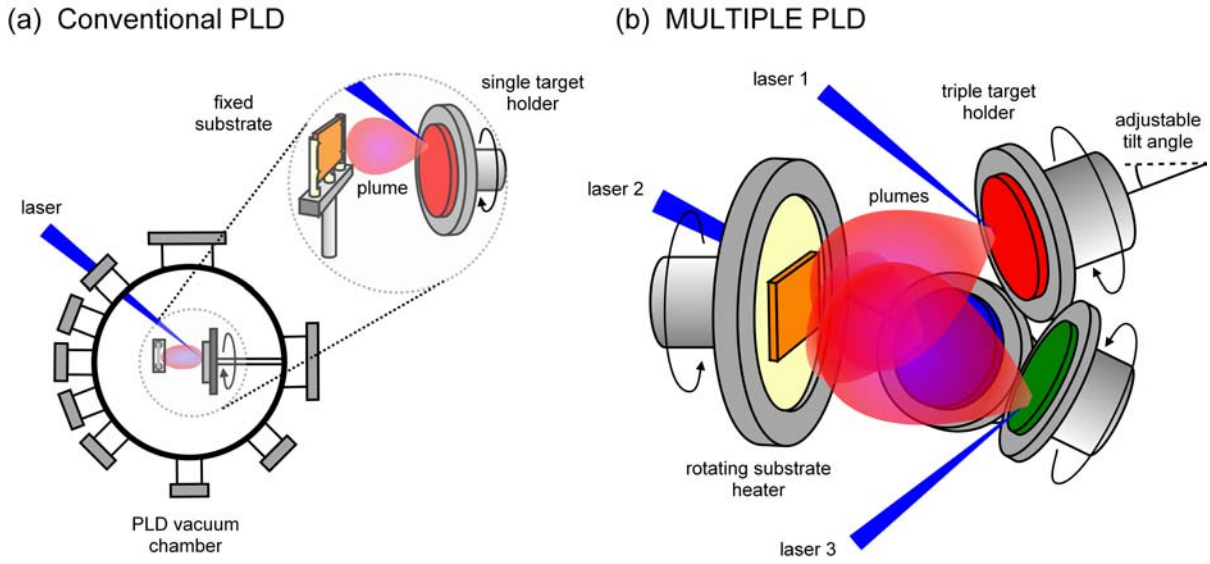
Invited talk at Tyndall National Institute, "Lee Maltings", Prospect Row, Cork, Ireland, April 3rd, 2007.

Pulsed laser deposition for growth of high quality epitaxial garnet films for low threshold waveguide lasers.



Rob Eason
Tim May-Smith
Christos Grivas
Dave Shepherd
Mark Darby
Rossana Gazia

Optoelectronics Research Centre
University of Southampton
Southampton
SO17 1BJ
UK

Abstract:

Pulsed laser deposition (PLD) is a mature technique capable of producing extremely high quality epitaxial single crystalline films. We have grown Nd:doped garnet films of GGG ($Gd_3Ga_5O_{12}$) on YAG substrates, with thicknesses from a few μm to more than 100 μm for both single mode and multimode waveguide applications. Our lowest losses for single-mode guides are less than 0.1dB cm^{-1}, and the resulting structures yield excellent waveguide lasing.

The talk will summarise our progress using conventional (single beam) PLD in thin-film and waveguide growth, using both nanosecond and femtosecond lasers, and also introduce our new directions in tri-beam PLD (three targets, three lasers) for growth of some interesting, complex and perhaps impossible structures, such as Gaussian doping, internal voids and even helically doped structures.