

# PHOTOREFRACTIVE GRATINGS IN OPTICAL FIBRES

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## ABSTRACT

Photorefractive fibre gratings are finding increasing use as quasi-distributed fibre strain and temperature sensors, filters in doped fibre amplifiers and narrowband feedback elements in tunable and single-frequency fibre lasers. These gratings can be fabricated routinely in a matter of minutes by exposing the core of a single-mode fibre to the interference pattern formed between two intersecting UV laser beams, and reflectivities in excess of 99% are now possible using this technique.

Over the last few months, we have obtained several world-beating results, including the longest fibre gratings yet produced ( $L \geq 20\text{mm}$ ), the narrowest bandwidth ( $\Delta\lambda \approx 0.05\text{nm}$ ) and the highest single-pulse reflectivity obtained to date ( $R=65\%$ ). By using a fibre which has been specially designed to have excellent photorefractive properties, induced index changes in excess of  $10^{-3}$  have been obtained. Miniature fibre Fabry-Perot cavities have also been manufactured.

The aim of this talk is not to review specific applications of these devices, but rather to give an insight into the methods of fabrication which are used and look in some detail at the latest results which have been obtained within the ORC. A brief look at future research trends will also be included.