

TOWARDS PRACTICAL SECOND-HARMONIC GENERATION

IN OPTICAL GLASS FIBRES

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Recent advances in silica fibres exhibiting second-order optical nonlinearities as a result of both self-induced and thermal poling processes are reported. Efficient second-harmonic generation in silica fibre subjected to a strong electrostatic field via internal electrodes was observed. Spatial periodic modulation of the applied electric field, responsible for the second-harmonic signal, arises from the interaction of the intense light at fundamental and doubled frequencies with glass, which has its inversion symmetry broken by the applied field. The process could represent the first evidence of coherent photoconductivity in glass - conductivity being dependent on the relative phase of the light fields at different frequencies. Moreover, D-shaped silica fibres have been periodically poled at elevated temperature by applying high voltage via a patterned electrode fabricated on the planar surface and high quality quasi-phase-matching structures have been created. Efficient frequency doubling of picosecond pulses to the blue in periodically poled fibre was demonstrated.