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## Performance of incoherently and coherently combined fibre and quantum cascade lasers

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Fibre and quantum cascade lasers represent one of the most significant recent advances in solid state lasers. Their ability to generate near-IR through THz wavelengths have found numerous application in communications, remote sensing and countermeasures for defence, security and commercial application. To achieve the required power levels in many practical applications it is desirable to combine several beams to form a single focused beam. This paper examines both incoherent and coherent beam combining and some of the effects imposed by atmospheric turbulence on the propagation of these combined beams. Here, beam centroid wander and beam spread are analyzed along with their contribution to laser spot size to obtain energy/power on target at given ranges for varying turbulence levels. It is found interestingly, that there is relatively little difference between energy/power delivered to a target whether beams are incoherently or coherently combined. Also, it is found that there is a maximum intensity that can be propagated that is independent of initial beam quality and size for km-type ranges and at moderate turbulence levels.

### Biography

Robert J Grasso completed his PhD from the University of Massachusetts in Solid State Physics. He is currently a Senior Principal Research Scientist with EOIR Technologies at Aberdeen Proving Ground in Maryland. His principal research interests include quantum cascade lasers, fibre lasers, infrared countermeasures, atmospheric propagation and remote sensing. He has published more than 100 papers, holds several patents, is an Editor for *Journal of Optical Engineering*, chairs several conferences dealing with lasers, optical countermeasures, remote sensing and atmospheric phenomenology and propagation. He also serves on the Technical Planning and Advisory Board for the SPIE Defence and Security Symposium.

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