Ray tracing model for solid-state laser crystals

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A ray tracing model for general solid state single pass amplifier is presented. The model is able to regard thermal lensing, depolarization, aberrations, amplification and beam shape changes. The algorithm can be applied to different amplifier shapes, such as slabs, rods or discs, as well optical elements, such as polarizers, lenses or mirrors. This method is computationally less extensive than the beam propagation or even the finite difference time domain method. Also the algorithm is more accurate than propagating beams with transfer matrix methods, since it can handle spatial resolved data.