

5.5 Fidelity in Double Phase-conjugate Mirrors

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Self-pumped phase conjugate mirrors operating with KNbO_3 crystals doped with iron have been optimized. The crystals were specially cut which allowed us to reach reflectivities of up to 60% without using external cavities. For the first time in KNbO_3 crystals the double incoherent phase conjugation is also reported with reflectivities of up to 65% and build up times of 10 seconds. To our knowledge we have performed the first experiments on quantitative investigations of fidelity of DPCM using interferometric methods which showed the high quality of the phase aberration correction achieved in Fe:KNbO_3 . Measurements of the fidelity of the phase conjugation process were performed by interfering the phase conjugate beam with a reference beam. The ability for phase aberration correction was nearly perfect. The quality and resolution of a reproduced image beam was measured with a resolution chart. We obtained a resolution of 100 lines per mm.