Diploma thesis abstract

“Laser beam shaping by means of the bimorph mirror based on Gerchberg-Saxton algorithm”

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In this work we present results of the given two-dimensional intensity distribution formation in the far-field region by means of the Gerchberg-Saxton iterative algorithm. Semi-passive bimorph flexible mirror has been used to reproduce phase profile, required for laser beam intensity profile transformation. We demonstrate super-gaussian irradiance formation of the 3^{rd} and 6^{th} order from a single-mode Gaussian irradiance profile. The formation accuracy of 0.17% and 4.06% respectively has been achieved.

The novel method, based on the Gerchberg-Saxton iterative procedure, has been proposed for the problem of multimode laser beam transformation. We were able to produce 3-order super-gaussian intensity distribution from the combination of TEM_{00} and TEM_{01} modes (with formation accuracy of 5.30%) and from combination of TEM_{00}+TEM_{01}+TEM_{10}+TEM_{02} modes (with accuracy of 1.60%).