

# **Experimental profiling of a non-truncated focused Gaussian beam and fine-tuning of the quadratic phase in the Fresnel Gaussian shape invariant**

Juan Manuel Franco S, Moisés Cywiak , David Cywiak, Idir Mourad

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## **Abstract.**

An especially dedicated homodyne profiler is used for recording the intensity distribution of focused non-truncated Gaussian beams. The spatial distributions are obtained at planes in the vicinity of the back-focal plane of a focusing lens placed at different distances from a He–Ne laser beam with a Gaussian intensity profile. Comparisons of the experimental data with those obtained from the analytical equations for an ideal focusing lens allow us to propose formulae to fine-tune the quadratic term in the Fresnel Gaussian shape invariant at each interface of the propagated field. We give analytical expressions to calculate adequately the propagation of the field through an optical system.