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Analysis of Fringe Field Formed Inside LDA Measurement Volume Using Compact Two Hologens Imaging Systems*

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We have designed and fabricated four LDA optical setups consisting of aberration compensated four different compact two hologens imaging systems. We have experimentally investigated and realized a hologens recording geometry which is interferogram of converging spherical wavefront with mutually coherent planar wavefront. Proposed real time monitoring and actual fringe field analysis techniques allow complete characterizations of fringes formed at measurement volume and permit to evaluate beam quality, alignment and fringe uniformity with greater precision. After experimentally analyzing the fringes formed at measurement volume by all four imaging systems, it is found that fringes obtained using compact two hologens imaging systems get improved both qualitatively and quantitatively compared to that obtained using conventional imaging system. Results indicate qualitative improvement of non uniformity in fringe thickness and micro intensity variations perpendicular to the fringes, and quantitative improvement of 39.25% in overall average normalized standard deviations of fringe width formed by compact two hologens imaging systems compared to that of conventional imaging system.

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