

On Freeform Control in System Aberations

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Abstract In order to improve the resolution of the imaging system, and achieve the theoretical limit, we introduced the technology principle of super resolution restructure from the point of view on theory and engineering. Several methods to realize high resolution restructure configurations are introduced based on theoretical analysis and engineering practice. Then, three kinds of restructure technologies, that prototype, micro scanning and sub pixel are described, and how to decrease their shortcomings are discussed in detail. Furthermore, to improve the band width by reconstruction without the spectral alias in super resolution technologies, a new coding technology combining a optical encoding and the sub pixel is proposed. With the global method, the bandwidth has been amplified by ten times as compared with that of traditional ones. Simulation results show that the system can meet the application requirements in MTF, REA, RMS and other related criteria. Compared with the conventional design, the system has reduced in volume and weight significantly. Therefore, the determining factors are the prototype selection and the system configuration combined optical, electronic and signal processing technologies, and as an important developing trend.