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Tesis: **"SUPER-RESOLUTION IN OPTICAL SYSTEMS"**

Resumen:

Imaging is a fundamental piece for distinct knowledge areas: object recognition, monitoring of diseases, observation of biological tissues area, astronomy, etc. In fact, many clinical advances have been through imaging techniques. Owing to these applications, improvement of imaging is of great importance. In this work, we deal with the improvement of imaging through the analysis of the spatial resolution of lenses in order to enhance their performance. The main objective of this thesis project was to generate super-resolution in a singlet lens through the modification of one or both surfaces of the lens. Hence, we present a method to achieve super-resolution of a lens (super-resolution is the ability of an optical system to resolve spatial structures of size smaller than the value limited by diffraction). The first task is to insure that the lens under analysis meets diffraction limited performance. This is necessary to warrant the minimum level of aberrations and a solution may be found. There are several types of aberrations, but the spherical aberration is not straightforward to be corrected. So, we carry out an analysis to design lenses without spherical aberration for a certain kind of aspherical lenses. Then, we proposed a method to design lenses with super-resolution properties. Finally, we demonstrated that method to generate lenses with super-resolution properties works analytically and experimentally.