Abstract

The Gouy phase is traditionally defined as the phase difference between a diffracted converging spherical wave, and a plane wave of the same frequency. It plays a role in many applications such as mode conversion, coherence tomography, and the tuning of the resonance frequency of laser cavities. In this thesis the Gouy phase has been adapted to study the phase behavior of other fields like a strongly focused vector field and a non-diffracting beam. Also, it has been generalized to describe fields that are partially coherent. Furthermore we discuss its implications for applications, such as optical metrology and optical calibration.