

Colloquium Announcement

“Geometrical Optics”

Abstract:

Geometrical optics is commonly associated with the ray-like properties of light, such as, law of reflection, Snell's law, ray tracing, the optical path length and phase. But geometrical optics is also a very useful solution to Maxwell equations under some very practical and widely applicable conditions. From the ray optics solution to Maxwell's equations, the intensity law and the optical wavefront naturally follow, as well as an asymptotic solution to Maxwell equations which allows ray optics to be used for analysis of wavelength dependent phenomena. This talk will first review how geometrical optics follows from Maxwell's equations and suggest how to construct a wavelength dependent asymptotic solution to Maxwell's equations. Then, we discuss several general properties of a general optical wavefront, which lead a formulation of the intensity law of geometrical optics. Then, we will discuss how the geometrical optics law of intensity provides a good foundation for understanding not only nonimaging optics through direct ways to design optical systems for prescribed illumination requirements but also imaging applications through a complete understanding of the differential geometry of the optical wavefront and the caustic surfaces. Several applications of these results to imaging and nonimaging optical systems will be summarized.

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UAB Department of Physics



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Thursday, September 14th, 12:30 – 1:45 pm

Campbell Hall 274

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