TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Wednesday, 22 October 2014, 4:00 p.m.
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

Refraction Problems in Geometric Optics

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Abstract. Given two homogeneous and isotropic materials I and II with refractive indices n_I and n_{II}, the problems described in this talk concern with the design of interface surfaces between the two materials, so that radiation emanating from one source lying in medium I and having a given intensity depending of the direction, is refracted by the surface into a prescribed destination, such us a set of directions or a target lying in medium II, and with a given intensity, in general a Radon measure. This leads to the design of lenses refracting radiation in a prescribed manner. We prove existence of these surfaces using an optimization process when the destination is a finite set, and then by a limiting process in the general case. The surface solutions satisfy nonlinear pdes of Monge-Ampère type.