

ANALYSIS AND DIFFERENTIAL GEOMETRY
SEMINAR

*The Near-Field Single Reflector Problem, a Generalized
Legendre Transform and Breaking of the Monge-Kantorovich
Optimality Property*

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Abstract: In recent years, the framework of Monge-Kantorovich optimal transport has proven quite successful in the design of innovative optical systems. A major improvement from a theoretical point of view as well as for practical applications is the design of free-form lenses and mirrors. The optimal transport approach has been applied to a variety of design problems for systems consisting of one or two lenses or reflectors. A classical problem in optical design is the so-called illumination or near-field single reflector problem. In this problem, one needs to design a reflecting surface such that the rays emitted from a non-isotropic source are reflected in such a way to create a prescribed in advance illumination pattern on a given target set at a finite distance. In this talk, we will discuss how the near-field problem fits into a generalized optimal transport framework and how solutions to this transport problem are related to solutions of the near-field problem.

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MATHEMATICS AND COMPUTER SCIENCE
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