1057-35-118 **Cristian E Gutierrez***, Department of Mathematics, Temple University, Philadelphia, PA 19122, and **Qingbo Huang**, Department of Mathematics and Statistics, Wright State University, Dayton, OH 45435. *The near field refractor problem.*

Let Ω be a domain in the sphere S^{n-1} and let $D \subset \mathbf{R}^n$ be a domain contained in an $n-1$ dimensional surface called the target domain or screen to be illuminated. Let n_1 and n_2 be the indexes of refraction of two homogeneous and isotropic media I and II, respectively, for example, glass and air. Suppose that from a point O surrounded by medium I, light emanates with intensity $f(x)$ for $x \in \Omega$, and D is surrounded by media II. We prove the existence of an optical surface $\mathcal{R}$ parameterized by $\mathcal{R} = \{\rho(x)x : x \in \overline{\Omega}\}$, interface between media I and II, such that all rays refracted by $\mathcal{R}$ into medium II illuminate the object D, and the prescribed illumination intensity received at each point $P \in D$ is $g(P)$. This yields the existence of a lens refracting light in a prescribed way. It is also proved that the solution satisfies a pde of Monge-Ampère type. (Received January 15, 2010)