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Eric C. Stachura* (estachura@haverford.edu). *Existence of weak solutions to refraction problems in negative refractive index materials.*

Weak solutions to refraction problems are studied when one material has a negative refractive index. It is shown how to construct an optical interface between two media such that, given a fixed direction $m \in S^2$, all monochromatic light rays emanating from the first medium are refracted into rays parallel to m . Methods from optimal mass transport are used to prove existence of weak solutions. Finally, the PDE associated with the surface is shown to be of Monge-Ampère type. (Received August 07, 2017)