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Free space microwave focusing by a negative-index gradient lens TOM DRISCOLL, PATRICK RYE, DIMITRI BASOV, SIA NEMAT-NASSER, University California, San Diego, TONY STARR, Sensormetrix, inc., DAVID SCHURIG, DAVID SMITH, Duke University — The complexity of left-handed metamaterials has advanced rapidly to the point where direct applications are now viable. We present a radial gradient-index lens with an index-of-refraction ranging from -2.67(edge) to -0.97(center). Experimentally, we find the lens can produce field intensities at the focus that are greater than that of the incident plane wave. These results are obtained at 10.3 GHz and are in excellent agreement with full-wave simulations. We also discuss the design and construction of this lens - which involved an advanced fabrication technique using conventional printed circuit board technology. This technique offers significant design, mechanical, and cost advantages over other microwave lens constructions.

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