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A Negative-Index Metamaterial Unit Cell R.V. PETROV, M.I. BICHURIN, Novgorod State University, Russia, D. VIEHLAND, Virginia Tech., G. SRINIVASAN, Oakland University — Metamaterials with a negative index of refraction can be realized in an array of straight wires and split-ring resonators (SRRs). Such structures will have a negative permittivity and permeability at a specific frequency. Here we provide the details on the design and characterization of a modified negative-index material (NIM) that uses cross-wire resonators (CWR). The resonators were made of copper wires having a diameter of 0.2 mm. Comparison of properties at 11.5 GHz for NIMs constructed with SRR and CWR is presented. For the NIM lens with CWR, precise control of the focal point is possible; the edges in the profile for intensity vs. distance are well defined, and the maximum achievable focal length is higher than for the split-ring NIMs. - supported by a grant from the NSF.

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