

Abstract Submitted
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Towards a Negative Refractive Index in an Atomic System ZACH SIMMONS, NICK BREWER, DENIZ YAVUZ, University of Wisconsin Madison — The goal of our experiments is to obtain a negative index of refraction in the optical region of the spectrum using an atomic system. The concept of negative refraction, which was first predicted by Veselago more than four decades ago, has recently emerged as a very exciting field of science. Negative index materials exhibit many seemingly strange properties such as electromagnetic vectors forming a left-handed triad. A key potential application for these materials was discovered in 2000 when Pendry predicted that a slab with a negative refractive index can image objects with a resolution far better than the diffraction limit. Thus far, research in negative index materials has primarily focused on meta-materials. The fixed response and often large absorption of these engineered materials motivates our efforts to work in an atomic system. An atomic media offers the potential to be actively modified, for example by changing laser parameters, and can be tuned to cancel absorption. A doped crystal allows for high atomic densities compared to other atomic systems. So far we have identified a transition in such a material, Eu:YSO, as a candidate for these experiments and are performing spectroscopy on this material.

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