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**Near-resonant light focusing and refraction in an elongated ultracold atom gas** JONATHAN GILBERT, COLIN ROBERTS, JACOB ROBERTS, Colorado State University — The density variation of atoms in a trapped ultracold atomic gas leads to a spatial variation of the index of refraction in the gas for near-resonant light. For commonly-realized experimental situations where light propagates along the axis of an elongated trapped atom gas, this index variation can lead to substantial focusing or defocusing of light propagating along the long direction of the gas. Remarkably, increases in light intensity by more than an order of magnitude above the incident intensity are predicted to occur in nominally optically thick gases where the absorption length is much smaller than the spatial extent of the gas. We will present calculations of the propagation of light in these situations as well as present the experimental observations that prompted us to examine the physics of this light propagation in more detail.

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