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Microwave-to-optical transduction of an audio signal in a thermal vapor[1] ANDREI TRETIAKOV, CLINTON POTTS, TIMOTHY LEE, MATTHEW THIESSEN, JOHN DAVIS, LINDSAY LEBLANC, University of Alberta — A number of recent experiments have shown that room-temperature atomic vapors can be used to receive and transmit information from a radio signal via an optical fiber. All these schemes rely on using electromagnetically-induced transparency and Autle-Townes splitting in Rydberg atoms to encode information retrieved from a GHz-carrier microwave field in laser light. We developed a different approach for radio-over-fiber communication with atomic vapors, which is based on microwave-to-optical double resonance. In our setup, we use a rubidium vapor cell enclosed in a high-Q microwave cavity, all at room temperature. We demonstrate the transduction of an audio-signal from amplitude and frequency modulation of the microwave field to intensity modulation of a laser light, which is based on magnetic-dipole interactions between the vapor and microwave field. Our setup avoids the need for stabilized laser systems associated with Rydberg atoms and/or electromagnetically induced transparency, all by exploiting the enhanced coupling made possibly by the cavity

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