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Understanding Zeeman EIT Noise Correlation Spectra in Buffered Rb Vapor SHANNON O'LEARY, AOJIE ZHENG, Lewis & Clark College, MICHAEL CRESCIMANNO, Youngstown State University — Noise correlation spectroscopy on systems manifesting Electromagnetically Induced Transparency (EIT) holds promise as a simple, robust method for performing high-resolution spectroscopy used in applications such as EIT-based atomic magnetometry and clocks. During laser light's propagation through a resonant medium, interaction with the medium converts laser phase noise into intensity noise. While this noise conversion can diminish the precision of EIT applications, noise correlation techniques transform the noise into a useful spectroscopic tool that can improve the application's precision. Using a single diode laser with large phase noise, we examine laser intensity noise and noise correlations from Zeeman EIT in a buffered Rb vapor. Of particular interest is a narrow noise correlation feature, resonant with EIT, that has been shown in earlier work to be power-broadening resistant at low powers. We report here on our recent experimental work and complementary theoretical modeling on EIT noise spectra, including a study of power broadening of the narrow noise correlation feature. Understanding the nature of the noise correlation spectrum is essential for optimizing EIT-noise applications.

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