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**Polarization and amplitude probes in Hanle effect EIT noise spectroscopy of a buffer gas cell** 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. 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. We study intensity noise, originating from the large phase noise of a semiconductor diode laser's light, in Rb vapor EIT in the Hanle configuration. We report here on our recent experimental work on and complementary theoretical modeling of the effects of light polarization preparation and post-selection on the correlation spectrum and on the independent noise channel traces. We also explain methodology and recent results for delineating the effects of residual laser amplitude fluctuations on the correlation noise resonance as compared to other contributing processes. Understanding these subtleties are essential for optimizing EIT-noise applications.

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