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**The Effect of Doppler Broadening on Electromagnetically Induced Transparency and Autler-Townes splitting in Molecular Cascade Excitation Scheme** ERGIN AHMED, ANGELOS LAZOUKIS, MARJATTA LYYRA, Temple University — We present here a theoretical analysis and interpretation of our recent experimental results on a molecular Electromagnetically Induced Transparency (EIT) and Autler-Townes (AT) splitting in a three-level cascade excitation scheme. We demonstrate analytical expressions for the Doppler broadened excitation spectra from the intermediate and upper levels in the limit of a weak coupling field, as is the case in all our experimental results. On the basis of these expressions we had investigated the critical role of Doppler averaging for observing EIT and AT-splitting in molecules. For example, for the AT effect we show that in Doppler broadened media there is a threshold coupling Rabi frequency above which the splitting can be observed experimentally and that the splitting is not only a function of the coupling Rabi frequency as is the case in homogeneously broadened media, but also strongly depends on the ratio of the wavelengths of the coupling and probe lasers.

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