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Rydberg electromagnetically induced transparency in Radio-Frequency Field JIANMING ZHAO, Shanxi University Taiyuan China, GEORG RAITHEL, Univ of Michigan - Ann Arbor — We investigate the electromagnetically induced transparency (EIT) involved a Rydberg level which is modulated with (40-100) MHz RF field. The cesium ground state $6S_{1/2}$, excited state $6P_{3/2}$ and Rydberg n$D_{5/2}$ state consist of three-level atomic system, where a strong coupling laser drives the Rydberg transition, $|6P_{3/2}\rangle \rightarrow |nD_{5/2}\rangle$, while a weak probe laser detects the EIT signal. The RF-dressed Rydberg EIT spectra show the Stark splitting and the even-th harmonic sidebands. The m_j =5/2 Stark line intersected with the m_j =1/2, m_j =3/2 sidebands, which provides an Rydberg-atom-based method for the accurate calibration of the RF electric field. We also investigate the dependence of the EIT spectra on the polarization of RF field and laser beams, the results show that m_j =5/2 strength increase with the angle, θ, defined between the polarizations of the laser beams and RF field, whereas the m_j =1/2, 3/2 sidebands strength decrease with θ. We model the experimental results using a Floquet model, the simulations are excellent agreement with the measurements. The investigation in this work provides an atom-based calibration of the polarization and amplitude of the RF-field using Rydberg-atom EIT.

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