Abstract Submitted
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A Theoretical perspective on N-resonance spectroscopy MICHAEL CRESCIMANNO, Youngstown State University, Physics Department, MICHAEL HOHENSEE, Harvard University, Cambridge, MA, DAVID PHILLIPS, IRINA NOVIKOVA, RONALD WALSWORTH, Harvard Smithsonian Center for Astrophysics — Recent experimental studies using the N-resonance [1,2] as a basis for secondary time standards are promising since they can be scaled small and enjoy competitive performance using D2 optical transition in Rubidium for which sources are cheaper and more readily available. There are essentaily four distinct hyperfine N-resonances in the D-system of alkalis (two of which have been studied experimentally), and it is apriori unclear which of the four are best suited for clock applications. We highlight the development and use of a theoretical quantum optics model using a truncated floquet solver to compare the figure of merits of the various N-resonances in the Rubidium D-system for potential clock applications. A simplified version of the model provides some insight into the physics behind the differences found.
[1] "Observation of a three-photon electromagnetically induced transparency in hot atomic vapor," A.S. Zibrov (Harvard/Lebedev), C.Y. Ye, Y.V. Rostovtsev, A.B. Matsko, and M.O. Scully (TAMU) Phys. Rev. A, 65, (2002) pg. 043817.
[2] "A novel absorption resonance for all-optical atomic clocks," S. Zibrov, I. Novikova, D.F. Phillips (Harvard-Smithsonian), A.V. Taichenachev, V.I. Yudin (LLF/Novosibirsk), R.L. Walsworth (Harvard-Smithsonian), and A.S. Zibrov (Harvard/Lebedev), physics/0501090, Jan 2005.

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