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Spin Level Pumping Enabled Slow Light by Transient Spectral Hole-Burning in Ruby

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The generation of slow light by transient spectral hole-burning technique has been reported, based on the ground state population storage in the spin level of R1 line of Ruby at 2.1 K under low magnetic field. The population of these spin levels were then optically modulated and investigated the effect of slow light as well. The transient hole-burning involves the depletion of the ground state leading to a highly populated excited state by single frequency laser excitation. This lead to a hole in the absorption spectrum when readout by a laser. The experiments were conducted by burning hole at the R1 (±3/2) line (4A2 to 2E transition) of a 7.3 mm Czochralski grown ruby (30ppm) in a magnetic field of B||c = 8.8 mT. The observed delay was 13.4 ns correspond to a group velocity value of c/550. Besides, the spin level population of the R1 (±3/2) line was enhanced by applying a strong pump signal at R1 (±1/2) line and measured the delay of 37 ns corresponds to the group velocity of c/1523.

Biography:

Muhammed Ajmal Pallithadathil Nazer is a PhD student at the University of New south Wales Canberra since September 2015. His research is mainly focused on the generation of slow and fast light by spectral hole-burning in transition metal and rare earth ion doped systems. He holds master degree in opto-electronics and laser technology from Cochin University in India and bachelors in Electronics and communication engineering from Kerala University, India. He has experience in nanotechnology and the development of high power solid-state laser as well. He was an Assistant Professor and presently hold the position of webmaster in IEEE ACT section, Australia. He has attended several conferences in which he published three conference papers and presented four posters in his career.