



Old Dominion University

Department of Physics

Dissertation Defense
Friday, May 17, 2024

"COHERENT BACKSCATTERING UNDER CONDITIONS OF ELECTROMAGNETICALLY INDUCED TRANSPARENCY IN ULTRACOLD RUBIDIUM"

Joshua D. Carter
Director: Dr. Charles Sukenik

Location: OCNPS 304, Physics Conference Room

Topic: Dissertation Defense: Josh Carter

Time: May 17, 2024, 11:00 AM Eastern Time (US and Canada)

Join Zoom Meeting

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Abstract:

This dissertation presents experimental results of coherent backscattering of light in an ultracold ensemble of rubidium atoms confined in a magneto optical trap under conditions of electromagnetically induced transparency (EIT) in a cascade-type system. Electromagnetically induced transparency was investigated experimentally in both a counterpropagating and orthogonal laser geometry and compared to theory. The experimental results were largely in good agreement with theory. Coherent backscattering was then measured with and without an EIT control field present to investigate the modification, if any, that EIT has on the enhancement of the coherent backscattering cone. The results indicated that the electromagnetically induced transparency reduced incoherent and coherent scattering differently, with a greater reduction in the coherent scattering processes.

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All interested persons are cordially invited to attend.