



# 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**

<https://odu.zoom.us/j/97647329952?pwd=Z1c1Y0FhSVhkVFVkbDRnQ2U1bmF5Zz09>

**Meeting ID:** 976 4732 9952

**Passcode:** 576541

**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.

One tap mobile  
+13017158592,,97647329952# US (Washington DC)  
+13052241968,,97647329952# US

---

Dial by your location

- +1 301 715 8592 US (Washington DC)
- +1 305 224 1968 US
- +1 309 205 3325 US
- +1 312 626 6799 US (Chicago)
- +1 646 558 8656 US (New York)
- +1 646 931 3860 US
- +1 386 347 5053 US
- +1 507 473 4847 US
- +1 564 217 2000 US
- +1 669 444 9171 US
- +1 669 900 6833 US (San Jose)
- +1 689 278 1000 US
- +1 719 359 4580 US
- +1 253 205 0468 US
- +1 253 215 8782 US (Tacoma)
- +1 346 248 7799 US (Houston)
- +1 360 209 5623 US

Meeting ID: 976 4732 9952

Find your local number: <https://odu.zoom.us/j/7ICxxUk>

---

Join by SIP

- [97647329952@zoomcrc.com](mailto:97647329952@zoomcrc.com)

---

Join by H.323

- 162.255.37.11 (US West)
- 162.255.36.11 (US East)
- 115.114.131.7 (India Mumbai)
- 115.114.115.7 (India Hyderabad)
- 213.19.144.110 (Amsterdam Netherlands)
- 213.244.140.110 (Germany)
- 103.122.166.55 (Australia Sydney)
- 103.122.167.55 (Australia Melbourne)
- 149.137.40.110 (Singapore)
- 64.211.144.160 (Brazil)
- 149.137.68.253 (Mexico)
- 69.174.57.160 (Canada Toronto)
- 65.39.152.160 (Canada Vancouver)
- 207.226.132.110 (Japan Tokyo)
- 149.137.24.110 (Japan Osaka)

**All interested persons are cordially invited to attend.**