Curriculum Vitae

Gombojav O, ARIUNBOLD, PhD.
Assistant Professor
Department of Physics and Astronomy
Mississippi State University
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CURRENT RESEARCH INTEREST:

- Cooperative phenomena in optical materials
- Applied spectroscopy in precision agriculture and environmental sciences
- Data Analytics

EDUCATION:

- Ph.D. in experimental physics, Texas A&M University, College Station, USA 2011
- Ph.D. in theoretical optics/opto-electronics, Palacky University, Olomouc, Czech, 2000

RESEARCH EXPERIENCE:

- Assistant professor, Mississippi State University - MSU (2015-Present)
- Head, the Ultrafast Laser Spectroscopy Lab at MSU (2016 – Present)
- Co-Head, the Optical Materials Lab, MSU (2021- Present)
- TEES research professor, Texas A&M University -TAMU (2013-2015)
- Visiting Scientist, Baylor University (2014-2015)
- Associate professor, National University of Mongolia - NUM (2000-2002, 2013-2015)
- Research associate, University of Arizona (2011-2012) and Texas A&M University (2003, 2005-2006)
- Alexander von Humboldt Research Fellow, Max-Planck Institute of Quantum Optics, Munich, Germany (2003-2004)

TEACHING EXPERIENCE:

Graduate level:

- PH8313 Electromagnetic Theory I, Fall 2015 - 2017, MSU

Split level:

- PH4323/6323 and PH4333/6333 Electromagnetic Fields I, II, 2018 – Present, MSU

Undergraduate level:

- PH1123 II, PH2213, PH2223, PH2233 Physics I, II, III, 2018 – Present, MSU

PATENT:

- Dmitry Pestov, Alexei V. Sokolov, Marlan O. Scully, Robert Murawski, **Ariunbold Gombojav**, Xi Wang, Vladimir Sautenkov, *Hybrid technique for Coherent Anti-Stokes/Stokes Raman Spectroscopy.*

SELECTED PEER REVIEWED PUBLICATIONS:

- **G.O. Ariunbold**, S. Nagpal, B. Semon, *Quantitative time-resolved buildup in three-color coherent anti-Stokes Raman scattering* Spectroscopy Letters, 53, 1-8 (2020).
- D. Pestov, R. K. Murawski, **G.O. Ariunbold**, X. Wang, M. Zhi, A. V. Sokolov, V. A. Sautenkov, Y. V. Rostovtsev, A. Dogariu, Y. Huang, and M. O. Scully, *Optimizing the Laser-Pulse Configuration for Coherent Raman Spectroscopy*, Science 316 (2007), pp. 265-268. *[Highlights on photonics spectra]*, *[Princeton University news]*, *[Science Daily]*, *[A perspective given by Dr. Robert Lucht in SCIENCE Magazine]*
- **G.O. Ariunbold**, *Asymmetric spectral noise correlations in coherent Stokes and anti-Stokes Raman scatterings*, OSA Continuum, 1, 832 (2018).
- D. Pestov, X. Wang, **G.O. Ariunbold**, R.K. Murawski, V. A. Sautenkov, A. Dogariu, A. V. Sokolov, and M. O. Scully, *Single-shot Detection of Bacterial Endospores via Coherent Raman Spectroscopy*, Proc. Natl. Acad. Sci. U.S.A. 105, 422 (2007).

- **G.O. Ariunbold,** A Byopadhyay, K Parameswaran, J Sacher, A Sengupta, *Advanced Spectroscopy in Precision Agriculture*, Optcs and Photonics News, **30**, 40, (2019).
- N. Altangerel, **G.O. Ariunbold**, et al., *In vivo diagnostics of early abiotic plant stress response via Raman spectroscopy*, PNAS, **114**, 3393 (2017). Research highlight by Chris Surridge "Remote phenotyping Raman reveals stress" Plant Nature, 3, 17052, 2017; Newsroom MSU by James Carskadon, "MSU physics professor's research informs global food security", May 19, 2017
- **G.O. Ariunbold**, M.M. Kash, V.A. Sautenkov, H. Li, Y.V. Rostovtsev, G.R. Welch, and M.O. Scully, *Observation of Picosecond Superfluorescent Pulses in Rubidium Vapor Pumped by 100-Femtosecond Laser Pulses*, Phys. Rev. A, 82, 043421 (2010).

SELECTED LIST OF INVITED PRESENTATIONS:

- Invited talk, OSA Incubator Meeting, 'Agri-Photonics: Advanced Spectroscopy in Precision Agriculture', Washington, DC, May 2019
- Invited talk, University of Memphis, TN, February 2019
- Invited talk, University of North Texas, Denton, TX, September 2018
- Invited talk, University of Tennessee Health Science Center, Memphis, TN, May 2018
- Invited talk, Department of Mathematics and Physics, Tennessee State University, October 2017
- Invited talk, Journal Club, Mississippi State University, January 2017
- Invited talk, Materials Working Group, Mississippi State University, August 2017
- Invited talk, Prof. Khanh Kieu's group, College of Optical Sciences, University of Arizona, March 16, 2017
- Invited talk, IGBB, MAFES, Mississippi State University, February 2016
- Invited talk, Chemistry Department, Mississippi State University, January 2016
- Invited talk, IQSE, Texas A&M University, College Station, TX, December 2015
- Invited talk, prof. M. Cicerone's group, NIST, MD, September 2015

PROFESSIONAL AFFILIATIONS & ACTIVITIES:

Member:

- Senior Member, Optical Society of America (OSA)
- Society of Applied Spectroscopy (SAS)
- American Friends of the Alexander von Humboldt Foundation

Ad hoc reviewer:

- Nature Photonics, Optics Letters, Optics Express, Applied Optics, Laser Physics, PLOS One, Journal of Optics A, Physics Letters A, Journal of Physics A and B, New Journal of Physics, Journal of Molecular Structure and reviewer for a book proposal (IOP publishing)

SERVICE:

Conferences and Workshops:

- Organizer, the AIS Panel Session: Microplastics in the Environment: Challenges and Opportunities (SpE5) at the OSA Optical and Sensing Congress, 2021.
- Co-organizer, the AIS Panel Session: Agri-Photonics (SpE2) at the OSA Optical and Sensing Congress, 2021.
- Co-organizer, Applied Industrial Spectroscopy Topical Meetings, OSA Optical Sensors & Sensing Congress 2020, 2021
- Co-organizer, Applications & Technology Topical Review: Optics and Photonics for Precision Agriculture, Conference on Lasers Electro-Optics (CLEO) 2020
- Co-chair, OSA Incubator Meeting, "Advanced Spectroscopy in Precision Agriculture", Washington, DC, May 12-14, 2019

University:

- Member of the graduate program committee, graduate exam committee, facility resources committee, recruiting committee and colloquia committee

Mentoring and Advising:

- Advising two PhD graduate students, MSU (2015 - Present)

- Mentor for two undergraduate students, MSU (2019 - Present)
- Mentor for a high-school student, Mississippi School of Mathematics and Science (2019)
- Mentor for four PhD students, TAMU (2013-2015)
- Advisor for two B.Sc. students (2002, NUM) and five M.Sc. students (2015, NUM and MSU) and one PhD student (2021, MSU)

HONORS & AWARDS:

- OSA Senior Member, 2021 - Present
- Herman F. Heep and Minnie Belle Heep Fellowship, 2010, 2011
- Alexander von Humboldt Research Fellowship, 2003, 2004
- Research Award, Mongolian Academy of Sciences, 2002
- DAAD German Academic Exchange Service Scholarship, 2001
- Teaching Excellence Award, NUM, 2000
- Czech Government Scholarship, 1997-2000

Appendix

LIST OF PUBLICATIONS:

1. **G.O. Ariunbold**, V.A. Sautenkov, D. Pestov, H. Li, X. Wang, M. Zhi, T. Begzjav, R.K. Murawski, A.V. Sokolov, M.O. Scully and Yu.V. Rostovtsev, *Observations of Ultrafast Superfluorescent Beatings in a Cesium Vapor Excited by Femtosecond Laser Pulses*, submitted (2021).
2. S. Nagpal, B. Semon and G.O. Ariunbold, *Distinguishing Resonant from Non-Resonant Nonlinear Optical Processes Using Intensity–Intensity Correlation Analyses* Appl. Spectrosc., in print (2021).
3. **G.O. Ariunbold**, B. Semon, S. Nagpal, and Yuri Rostovtsev, *Ultrafast dephasing in hydrogen-bonded pyridine–water mixtures*, Open Physics, 19, 234-240 (2021).
4. **G.O. Ariunbold**, S. Nagpal, B. Semon, *Quantitative time-resolved buildup in three-color coherent anti-Stokes Raman scattering* Spectroscopy Letters, 53, 1-8 (2020)
5. **G.O. Ariunbold**, B. Semon, S. Nagpal, P. Adhikari, *Coherent Anti-Stokes–Stokes Raman Cross-Correlation Spectroscopy: Asymmetric Frequency Shifts in Hydrogen-Bonded Pyridine-Water Complexes*, Appl. Spectrosc. **73** 1099-1106 (2019).
6. **G.O. Ariunbold,** A Byopadhyay, K Parameswaran, J Sacher, A Sengupta, *Advanced Spectroscopy in Precision Agriculture*, Optcs and Photonics News, **30**, 40, (2019)
7. N.R. Subedi, P. Adhikari, M. Berg, and **G.O. Ariunbold**, *Contact-free microparticle characterization via Raman spectroscopy and digital holography*, J. Opt. 20 095608 (2018).
8. **G.O. Ariunbold**, *Asymmetric spectral noise correlations in coherent Stokes and anti-Stokes Raman scatterings*, OSA Continuum, 1, 832 (2018).
9. N. Altangerel, **G.O. Ariunbold**, et al., *In vivo diagnostics of early abiotic plant stress response via Raman spectroscopy*, PNAS, **114**, 3393 (2017). Research highlight by Chris Surridge "Remote phenotyping Raman reveals stress" Plant Nature, 3, 17052, 2017; Newsroom MSU by James Carskadon, "MSU physics professor's research informs global food security", May 19, 2017
10. N. Altangerel, **G.O. Ariunbold**, et al., *Reply to Dong and Zhao: Plant stress via Raman spectroscopy* Proc. Nat. Acad. Sci., **114**, E5488 (2017).
11. **G.O. Ariunbold** and N. Altangerel, *Quantitative interpretation of time-resolved coherent anti-Stokes Raman spectroscopy with all Gaussian pulses*, J. Raman Spectrosc. **48**, 104 (2017).
12. **G.O. Ariunbold** and N. Altangerel, *Coherent anti-Stokes Raman spectroscopy: Understanding the essentials*, Coherent Opt. Phenom., review paper, **3**, 6 (2016).
13. Z. Yi**,** P. K. Jha**,** L. Yuan**,** D.V. Voronine**, G.O. Ariunbold**, A.M. Sinyukov, Z. Di, V.A. Sautenkov, Y.V. Rostovtsev, and A.V. Sokolov**,** *Observing the transition from yoked superuorescence to superradiance*, Opt. Commun. **351**, 45 (2015).
14. D.V. Voronine, A.M. Sinyukov, X. Hua, E. Munusamy, **G.O. Ariunbold**, A.V. Sokolov and M.O. Scully, *Complex Line Shapes in Surface-Enhanced Coherent Raman Spectroscopy*, J. Mod. Opt., **62**, 90 (2015).
15. J. Thompson, C. Ballmann, H. Cai, Z. Yi, Y. Rostovtsev, A. Sokolov, P. Hemmer, A. Zheltikov, and **G.O. Ariunbold** and M.O. Scully, *Pulsed cooperative backward emissions from non-degenerate atomic transitions in sodium*, New J. Phys. **16**, 103017 (2014).
16. I.V. Fedotov, A.A. Voronin, N. Altangerel, S. Blakley, H. Perez, **G.O. Ariunbold** and A.M. Zheltikov, *All-fiber ultralow-energy soliton management at 1.55 micrometre*, Laser Phys. Lett., **11**, 125801 (2014).
17. M. Scheller, X. Chen, **G.O. Ariunbold**, N. Born, J. Moloney, M. Kolesik, and P. Polynkin, *Raman conversion in intense femtosecond Bessel beams in air*, Phys. Rev. A 89, 053805 (2014).
18. **G.O. Ariunbold**, V.A. Sautenkov, and M.O. Scully, *Ultrafast laser control of backward superfluorescence towards standoff sensing*, Appl. Phys. Lett. **104**, 021114 (2014).
19. **G.O. Ariunbold**, V.A. Sautenkov, and M.O. Scully, *Temporal coherent control of superfluorescent pulses*, Opt. Lett., 37, 2400, (2012).
20. L. Yuan, D. Pestov, R.K. Murawski, **G.O. Ariunbold**, M. Zhi1, X. Wang, V.A. Sautenkov, Y.V.Rostovtsev, T. Siebert and A.V. Sokolov, *Tracking of Molecular Wave-Packets in Cesium Dimers using Coherent Raman Scattering*, 86, 023421, Phys. Rev. A (2012).
21. **G.O. Ariunbold**, P. Polynkin and J.V. Moloney, *Third and fifth harmonic generation by tightly focused femtosecond pulses at 2.2 μm wavelength in air* Opt. Express, 20, 1662 (2012).
22. **G.O. Ariunbold**, W. Yang, A.V. Sokolov, V.A. Sautenkov, and M.O. Scully, *Superradiance in a Three-Photon Resonant Medium*, 85, 023424, Phys. Rev. A (2012).
23. **G.O. Ariunbold**, V.A. Sautenkov, and M.O. Scully, *Quantum fluctuations of superfluorescence delay observed with ultrashort optical excitations*, Phys. Lett. A, 376, 335 (2012).
24. **G.O. Ariunbold**, M.M. Kash, V.A. Sautenkov, H. Li, Y.V. Rostovtsev, G.R. Welch, and M.O. Scully, *Picosecond UV pulses Produced by Coherent Scattering of IR Femtosecond Pulses*, JOSA B, 28, 515 (2011).

25. **G.O. Ariunbold**, V.A. Sautenkov, and M.O. Scully, *A Switching from a Sequential Transition to Quantum Beating in Atomic Rubidium Pumped by a Femtosecond Laser*, JOSA B, 28, 462 (2011).
26. **G.O. Ariunbold**, M.M. Kash, V.A. Sautenkov, H. Li, Y.V. Rostovtsev, G.R. Welch, and M.O. Scully, *Observation of Picosecond Superfluorescent Pulses in Rubidium Vapor Pumped by 100-Femtosecond Laser Pulses*, Phys. Rev. A, 82, 043421 (2010).
27. L. Yuan, **G.O. Ariunbold**, R.K. Murawski, D. Pestov, X. Wang, V.A. Sautenkov, A.V. Sokolov, Y.V. Rostovsvtsev and M.O. Scully, *Femtosecond Wave-Packet Dynamics in Cesium Dimers Studied through Controlled Stimulated Emission*, Phys. Rev. A 81, 053405 (2010).
28. **G.O. Ariunbold**, Y.V. Rostovtsev, V.A. Sautenkov and M.O. Scully, *Intensity correlations and anticorrelations in coherently driven atoms*, Special issue: Festschrift in Memory of Lorenzo M. Narducci, J. Mod. Opt. 57 1417 (2010).
29. Lucas M. Naveira, Benjamin D. Strycker, Jieyu Wang, **Gombojav O. Ariunbold**, Alexei V. Sokolov, and George W. Kattawar, *Propagation of femtosecond laser pulses through water in the linear absorption regime*, App. Opt. 48 1828 (2009).
30. **G.O. Ariunbold**, M.M. Kash, H. Li, V.A. Sautenkov, Y.V. Rostevtsev, G.R. Welch and M.O. Scully, *A model experiment for Stand-Off Sensing*, J. Mod. Opt. 55, 3273 (2008)
31. T.S. Varzhapetyan, H. Li, **G.O. Ariunbold**, V.A. Sautenkov, Y.V. Rostevtsev and M.O. Scully, *Intensity correlations in a coherently prepared Rb vapor in a magnetic field*, Opt. Commun. 282, 39 (2008).
32. D. Pestov, Xi Wang, R. K. Murawski, **G. O. Ariunbold**, V. A. Sautenkov, and A. V. Sokolov, *Pulse shaping for mode-selective ultrafast coherent Raman spectroscopy of highly scattering solids*, J. Opt. Soc. Am. B, 25, 768 (2008).
33. D. Pestov, X. Wang, **G. O. Ariunbold**, R. K. Murawski, V. A. Sautenkov, A. Dogariu, A. V. Sokolov, and M. O. Scully, *Single-shot Detection of Bacterial Endospores via Coherent Raman Spectroscopy*, Proc. Natl. Acad. Sci. U.S.A. 105, 422 (2007).
34. D. Pestov, **G. O. Ariunbold**, X. Wang, R. K. Murawski, V. A. Sautenkov, A. V. Sokolov, and M. O. Scully, *Coherent versus incoherent Raman scattering: molecular coherence excitation and measurement*, Optics Letters 32 (2007), pp. 1725-1727. *[selected for the August 2007 issue of Virtual Journal of Ultrafast Science]*
35. D. Pestov, R. K. Murawski, **G. O. Ariunbold**, X. Wang, M. Zhi, A. V. Sokolov, V. A. Sautenkov, Y. V. Rostovtsev, A. Dogariu, Y. Huang, and M. O. Scully, *Optimizing the Laser-Pulse Configuration for Coherent Raman Spectroscopy*, Science 316 (2007), pp. 265-268. *[Highlights on photonics spectra]*, *[Princeton University news]*, *[Science Daily]*, *[A perspective given by Dr. Robert Lucht in SCIENCE Magazine]*
36. **G.O. Ariunbold**, G.S. Agarwal, Z. Wang, M.O. Scully and H. Walther: *Nanosecond Dynamics of Single-Molecule Fluorescence Resonance Energy Transfer* Phys. Chem. A, 108, 2402 (2004).
37. G.S. Agarwal, **G.O. Ariunbold**, J. von Zanthier and H. Walther: *Nonclassical Imaging for a Quantum Search of Trapped Ions* Phys. Rev. A, 70, 063816 (2004). *[selected for the January 2005, Vol. 5, 1 issue of Virtual Journal of Quantum Information]*
38. **G. Ariunbold** and J. Perina: *Nonclassical behavior and switching in Kerr nonlinear couplers*, J.Mod.Opt. 48, 1005, (2001).
39. **G. Ariunbold** and J. Perina: *Quantum statistical properties of contradirectional Kerr couplers*, Opt. Commun. 176, 149 (2000).
40. **G. Ariunbold**, J. Perina and Ts. Gantsog: *Pair-atomic effects in the micromaser*, Acta Phys. Slov. 50, 507 (2000).
41. **G. Ariunbold**, J. Perina, Ts. Gantsog and F.A.A. El-Orany: *Two-mode correlated states in cavity with injected atoms* Acta Phys. Slov. 49, 627 (1999).
42. **G. Ariunbold**, J. Perina and Ts. Gantsog: *Nonclassical states in cavity with injected atoms*, J. Opt. B: Quantum Semiclass. Opt. 1, 219 (1999).
43. **G. Ariunbold**, J. Perina and Ts. Gantsog: *Holstein-Primakoff SU(1,1) coherent state in the micromaser under intensity dependent Jaynes-Cummings interactions*, Special Issue on Quantum Optics and Quantum Information, Acta Phys. Slov. 48, 315 (1998).

THESES:

1. **Ariunbold Gombojav**, "*Ultrafast Cooperative Phenomena in Coherently prepared Media: From Superfluorescence to Coherent Raman Scattering and Applications*"; PhD Thesis, Texas A&M University, USA (2011).
2. **Gombojav Ariunbold**, *"Interactions of Matter with Nonclassical Light"*; PhD Thesis, Palacky University, Czech Republic (2000).

LIST OF PROCEEDINGS WITH REVIEW COMMITTEE:

1. B. Semon, A. Chriat, H. Wang, L. Priddy, L. Lu, M. Jaffe and **G.O. Ariunbold**, *Rapid, Contact-Free, Multimodal, Non-Linear Optical Imaging for Collagen in Formalin-Fixed Paraffin-Embedded Tendon Tissues* ECBO 2021 – European Conferences on Biomedical Optics, June 20-24, 2021 (SPIE and OSA).
2. **G.O. Ariunbold**, B. Semon and S. Nagpal, *Chemical Sensing via Resonant Deferred Signal Buildup*, the OSA Optical and Sensing Congress, 19-23 July 2021. AW5G.5.
3. **G.O. Ariunbold**, B Semon, S Nagpal, and Y Rostovtsev, *Cooperative Emissions from Hydrogen-Bonded Heterocyclic Organic Compounds* - CLEO: Applications and Technology, (Optical Society of America, 2020), AW4K.4
4. S. Nagpal, P. Adhikari, W.P. Williams, G. Windham, G.A. Matthews and **G.O. Ariunbold**, *Development of a Laser-induced Fluorescence Sensor Module used with Unmanned Aerials Vehicles***,** CLEO 2018 OSA Technical Digest (online) (Optical Society of America, 2018), STu4P.5
5. **G.O. Ariunbold**, S. Nagpal, P. Adhikari, E. Purevjav and L. Lu, *Vibrational Spectroscopic Preliminary Study of Blood and Its Components in Mice*, in *Frontiers in Optics 2018*, OSA Technical Digest (online) (Optical Society of America, 2018), paper JTu2A.127.
6. N.R. Subedi, **G.O. Ariunbold**, P. Adhikari, and M.J. Berg, *Standoff microparticles characterization with digital holographic Raman spectroscopy*, in *Frontiers in Optics 2018*, OSA Technical Digest (online) (Optical Society of America, 2018), paper JTu2A.111.
7. N.R. Subedi, P. Adhikari, and G.O. Ariunbold, *Integrated Raman Spectroscopy with Digital Holography for Microparticle Characterization*, in *Frontiers in Optics 2017*, OSA Technical Digest (online) (Optical Society of America, 2017), paper FTh4B.4.
8. N. Altangerel, **G.O. Ariunbold**, C. Gorman, D. Bohlmeyer, J. Yuan, P. Hemmer, and M.O. Scully, *Early, in vivo, Detection of Abiotic Plant Stress Responses via Raman Spectroscopy*, CLEO, 2016.
9. N. Altangerel, **G.O. Ariunbold**, Z. Yi, T. Begzjav, E. Ocola, J. Laane, and M.O. Scully, *Coherent Stokes Raman Spectroscopy of Pyridine in Gas-Phase at Low Temperature*, CLEO, 2016.
10. **G.O. Ariunbold**, V.A. Sautenkov and M.O. Scully, *A Rapid Inspection of Quantum Interference using Superfluorescent Picosecond Pulses*, CLEO 2010.
11. A.V. Sokolov, **G.O. Ariunbold**, X. Wang and M.O. Scully, *Controlling Directionality of Mirror-less Lasing by Pulse Shaping and Timing*, CLEO/QELS 2010.
12. **G.O. Ariunbold**, M. M. Kash, H. Li, V. Sautenkov, Y. Rostovtsev, G. R. Welch, and M. O. Scully, *A Model Experiment for Stand-off Sensing*, in *Frontiers in Optics*, OSA Technical Digest (CD) (Optical Society of America, 2008), paper FThO6, October 19, 2008, Rochester, NY.
13. D. Pestov, **G.O. Ariunbold**, X. Wang, R.K. Murawski, V.A. Sautenkov, Y.V. Rostovtsev, A. Patnaik, A.V. Sokolov and M.O. Scully, *Monitoring Vibrational Wave Packet Dynamics via Direct Femtosecond Pump-Probe Measurements*, Tech. Dig., Conf. on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conf. (CLEO/QELS), May 2007, Baltimore, MD.
14. D. Pestov, R.K. Murawski, **G.O. Ariunbold**, X. Wang, M. Zhi, A.V. Sokolov, V.A. Sautenkov, Y.V. Rostovtsev, and M.O. Scully, *Hybrid of Frequency and Time Resolved CARS*, Tech. Dig., Conf. on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conf. (CLEO/QELS), May 2007, Baltimore, MD.
15. D. Pestov, R.K. Murawski, **G.O. Ariunbold**, X. Wang, M. Zhi, A.V. Sokolov, V.A. Sautenkov, Y.V. Rostovtsev, and M.O. Scully, *Detection of B. subtilis spores via Hybrid CARS*, Tech. Dig., Conf. on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conf. (CLEO/QELS), May 2007, Baltimore, MD.
16. V.A. Sautenkov, **G.O. Ariunbold**, Y.V. Rostovtsev, and M.O. Scully, *From EIT photon correlations to Raman anti-correlations in coherently prepared Rb vapor*, Tech. Dig., Conf. on Lasers and Electro-Optics and Quantum Electronics and Laser Science Conf. (CLEO/QELS), May 2006, Long Beach, CA.