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PUBLICATIONS IN REFEREED JOURNALS

- Processes* 2022 Invited review: On macroscopic quantum coherence with synchronized
MDPI IF-3.3 atoms and molecules: Perspective
O. Ariunbold, (*under review*), *Processes*, MDPI
- Phys. Lett. A* 2022 Cascade Superradiance Model
IF-2.7 **G. O. Ariunbold**, (*under review*), arXiv preprint arXiv:2207.11841 (2022)
- Frontiers in Phys.* 2022 Multiple Pathway Quantum Beats Spectroscopy
IF-3.7 Z. Yi, T. Begzjav, **G. O. Ariunbold**, A. M. Zheltikov, A. V. Sokolov, and M. O. Scully, *Frontiers in Physics*, 10, 921499 (2022)
- Phys. Lett. A* 2022 Observations of Ultrafast Superfluorescent Beatings in a Cesium Vapor
IF-2.7 Excited by Femtosecond Laser Pulses
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, *Phys. Lett. A*, 428, 127945 (2022)
- Appl. Spectrosc.* 2021 Distinguishing Resonant from Non-Resonant Nonlinear Optical
IF-3.6 Processes Using Intensity–Intensity Correlation Analyses
S. Nagpal, B. Semon and **G. O. Ariunbold**, *Appl. Spectrosc.*, 75, 1382, (2021). (*hereinafter, the names of students, as of publication date, are in red and underlined*)
- Open Physics* 2021 Ultrafast dephasing in hydrogen-bonded pyridine–water mixtures
IF-1.3 **G. O. Ariunbold**, B. Semon, S. Nagpal, and Yuri Rostovtsev, *Open Physics*, 19, 234 (2021)
- Spectrosc. Lett.* 2020 Quantitative time-resolved buildup in three-color coherent anti-Stoke
IF-1.3 Raman scattering
G. O. Ariunbold, S. Nagpal, B. Semon, *Spectroscopy Letters*, 53, 1, (2020)

- Appl. Spectrosc.* 2019 Coherent Anti-Stokes–Stokes Raman Cross-Correlation Spectroscopy: Asymmetric Frequency Shifts in Hydrogen-Bonded Pyridine-Water Complexes
IF-3.6
G. O. Ariunbold, [B. Semon](#), [S. Nagpal](#), [P. Adhikari](#), *Appl. Spectrosc.* 73 1099 (2019)
- Optics Photonics* 2019 Advanced Spectroscopy in Precision Agriculture News
IF-2.0
G. O. Ariunbold, A. Byopadhyay, K Parameswaran, J Sacher, A Sengupta, *Optics and Photonics News*, 30, 40, (2019)
- J. Opt.* 2018 Contact-free microparticle characterization via Raman spectroscopy and digital holography
IF-2.1
N.R. Subedi, [P. Adhikari](#), M. Berg, and **G. O. Ariunbold**, *J. Opt.* 20 095608 (2018)
- Optics Continuum* 2018 Asymmetric spectral noise correlations in coherent Stokes and anti-Stokes Raman scatterings
IF-1.9
G. O. Ariunbold, *Optics Continuum*, 1, 832 (2018)
- PNAS* 2017 Reply to Dong and Zhao: Plant stress via Raman spectroscopy
IF-12.8
[N. Altangerel](#), **G. O. Ariunbold**, et al., *Proc. Nat. Acad. Sci.*, 114, E5488 (2017)
- PNAS* 2017 In vivo diagnostics of early abiotic plant stress response via Raman spectroscopy
IF-12.8
[N. Altangerel](#), **G. O. Ariunbold**, et al., *PNAS*, 114, 3393 (2017). Research highlight by Chris Surridge “Remote phenotyping Raman reveals stress” *Plant Nature*, 3, 17052, (2017)
- J. Raman Spectrosc.* 2017 Quantitative interpretation of time-resolved coherent anti-Stokes Raman spectroscopy with all Gaussian pulses
IF-3.1
G. O. Ariunbold and [N. Altangerel](#), *J. Raman Spectrosc.* 48, 104 (2017)
- Coherent Opt. Phenom IF-NA* 2016 Invited review: Coherent anti-Stokes Raman spectroscopy: Understanding the essentials
2016
G. O. Ariunbold and [N. Altangerel](#), *Coherent Opt. Phenom.*, Invited Review, 3, 6 (2016)
- Opt. Commun.* 2015 Observing the transition from yoked superfluorescence to superradiance
IF-2.3
[Z. Yi](#), P. K. Jha, [L. Yuan](#), D. V. Voronine, **G. O. Ariunbold**, et al., *Opt. Commun.* 351, 45 (2015)
- J. Mod. Opt.* 2015 Complex Line Shapes in Surface-Enhanced Coherent Raman Spectroscopy
IF-1.3
D. V. Voronine, A. M. Sinyukov, [X. Hua](#), E. Munusamy, **G. O. Ariunbold**, et al., *J. Mod. Opt.*, 62, 90 (2015)
- New J. Phys.* 2014 Pulsed cooperative backward emissions from non-degenerate atomic transitions in sodium
IF-3.7
[J. Thompson](#), [C. Ballmann](#), [H. Cai](#), [Z. Yi](#), Y. Rostovtsev, A. Sokolov, P. Hemmer, A. Zheltikov, **G. O. Ariunbold** and M.O. Scully, *New J. Phys.* 16, 103017 (2014)
- Laser Phys. Lett.* 2014 All-fiber ultralow-energy soliton management at 1.55 micrometre
IF-1.7
I.V. Fedotov, A.A. Voronin, [N. Altangerel](#), [S. Blakley](#), H. Perez, **G. O. Ariunbold** and A. M. Zheltikov, *Laser Phys. Lett.*, 11, 125801 (2014)

- Phys. Rev. A*
IF-3.0 2014 Raman conversion in intense femtosecond Bessel beams in air
M. Scheller, [X. Chen](#), **G. O. Ariunbold**, et al., *Phys. Rev. A* 89, 053805 (2014)
- Appl. Phys. Lett.*
IF-4.0 2014 Ultrafast laser control of backward superfluorescence towards standoff sensing
G. O. Ariunbold, V. A. Sautenkov, and M. O. Scully, *Appl. Phys. Lett.* 104, 021114 (2014)
- Opt. Lett.*
IF-3.6 2012 Temporal coherent control of superfluorescent pulses
G. O. Ariunbold, V. A. Sautenkov, and M. O. Scully, *Opt. Lett.*, 37, 2400, (2012)
- Phys. Rev. A*
IF-3.0 2012 Tracking of Molecular Wave-Packets in Cesium Dimers using Coherent Raman Scattering
[L. Yuan](#), D. Pestov, R. K. Murawski, **G. O. Ariunbold**, et al., 86, 023421, *Phys. Rev. A* (2012).
- Opt. Express.*
IF-3.8 2012 Third and fifth harmonic generation by tightly focused femtosecond pulses at 2.2 μm wavelength in air
G. O. Ariunbold, P. Polynkin and J. V. Moloney, *Opt. Express*, 20, 1662 (2012)
- Phys. Rev. A*
IF-3.0 2012 Superradiance in a Three-Photon Resonant Medium
G. O. Ariunbold, [W. Yang](#), A. V. Sokolov, V. A. Sautenkov, and M. O. Scully, 85, 023424, *Phys. Rev. A* (2012)
- Phys. Lett. A*
IF-2.7 2012 Quantum fluctuations of superfluorescence delay observed with ultrashort optical excitations
G. O. Ariunbold, V. A. Sautenkov, and M. O. Scully, *Phys. Lett. A*, 376, 335 (2012)
- JOSA B*
IF-2.1 2011 Picosecond UV pulses Produced by Coherent Scattering of IR Femtosecond Pulses
G. O. Ariunbold, M. M. Kash, V. A. Sautenkov, H. Li, Y. V. Rostovtsev, G. R. Welch, and M. O. Scully, *JOSA B*, 28, 515 (2011)
- JOSA B*
IF-2.1 2011 Switching from a Sequential Transition to Quantum Beating in Atomic Rubidium Pumped by a Femtosecond Laser
G. O. Ariunbold, V. A. Sautenkov, and M. O. Scully, *JOSA B*, 28, 462 (2011)
- Phys. Rev. A*
IF-3.0 2010 Observation of Picosecond Superfluorescent Pulses in Rubidium Vapor Pumped by 100-Femtosecond Laser Pulses
G. O. Ariunbold, M. M. Kash, V. A. Sautenkov, H. Li, Y. V. Rostovtsev, G. R. Welch, and M. O. Scully, *Phys. Rev. A*, 82, 043421 (2010)
- Phys. Rev. A*
IF-3.0 2010 Femtosecond Wave-Packet Dynamics in Cesium Dimers Studied through Controlled Stimulated Emission
[L. Yuan](#), **G. O. Ariunbold**, R. K. Murawski, D. Pestov, X. Wang, V. A. Sautenkov, A. V. Sokolov, Y. V. Rostovtsev, and M. O. Scully, *Phys. Rev. A* 81, 053405 (2010)
- J. Mod. Opt.*
Spec. Iss.
IF-1.3 2010 Intensity correlations and anticorrelations in coherently driven atoms
G. O. Ariunbold, Y. V. Rostovtsev, V. A. Sautenkov and M. O. Scully Special issue: Festschrift in Memory of Lorenzo M. Narducci, *J. Mod. Opt.* 57 1417 (2010)

- App. Opt.*
IF-1.9 2009 Propagation of femtosecond laser pulses through water in the linear absorption regime
[L. M. Naveira](#), [B. D. Strycker](#), J. Wang, **G. O. Ariunbold**, A. V. Sokolov, and G. W. Kattawar, *App. Opt.* 48 1828 (2009).
- J. Mod. Opt.*
IF-1.3 2008 A model experiment for Stand-Off Sensing
G. O. Ariunbold, M. M. Kash, [H. Li](#), V. A. Sautenkov, Y. V. Rostevtsev, G. R. Welch, and M. O. Scully, *J. Mod. Opt.* 55, 3273 (2008)
- Opt. Commun.*
IF-2.3 2008 Intensity correlations in a coherently prepared Rb vapor in a magnetic field
T. S. Varzhapetyan, [H. Li](#), **G. O. Ariunbold**, V. A. Sautenkov, Y. V. Rostevtsev, and M. O. Scully, *Opt. Commun.* 282, 39 (2008)
- JOSA B*
IF-2.1 2008 Pulse shaping for mode-selective ultrafast coherent Raman spectroscopy of highly scattering solids
[D. Pestov](#), [X. Wang](#), R. K. Murawski, **G. O. Ariunbold**, V. A. Sautenkov, and A. V. Sokolov, *J. Opt. Soc. Am. B*, 25, 768 (2008)
- PNAS*
IF-12.8 2007 Single-shot Detection of Bacterial Endospores via Coherent Raman Spectroscopy
[D. Pestov](#), [X. Wang](#), **G. O. Ariunbold**, R. K. Murawski, V. A. Sautenkov, A. Dogariu, A. V. Sokolov, and M. O. Scully, *Proc. Natl. Acad. Sci. U.S.A.* 105, 422 (2007)
- Opt. Lett.*
IF-3.6 2007 Coherent versus incoherent Raman scattering: molecular coherence excitation and measurement
[D. Pestov](#), **G. O. Ariunbold**, [X. Wang](#), R. K. Murawski, V. A. Sautenkov, A. V. Sokolov, and M. O. Scully, *Optics Letters* 32 (2007), pp. 1725-1727. [selected for the August 2007 issue of *Virtual Journal of Ultrafast Science*]
- Science*
IF-63.7 2007 Optimizing the Laser-Pulse Configuration for Coherent Raman Spectroscopy
[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, *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*]
- Phys. Chem. A*
IF-2.9 2004 Nanosecond Dynamics of Single-Molecule Fluorescence Resonance Energy Transfer
G. O. Ariunbold, G. S. Agarwal, Z. Wang, M. O. Scully, and H. Walther, *Phys. Chem. A*, 108, 2402 (2004)
- Phys. Rev. A*
IF-3.0 2004 Nonclassical Imaging for a Quantum Search of Trapped Ions
G. S. Agarwal, **G. O. Ariunbold**, J. von Zanthier and H. Walther, *Phys. Rev. A*, 70, 063816 (2004) [selected for the January 2005, Vol. 5, 1 issue of *Virtual Journal of Quantum Information*]
- J. Mod. Opt.*
IF-1.3 2001 Nonclassical behavior and switching in Kerr nonlinear couplers
G. Ariunbold and J. Perina, *J. Mod. Opt.* 48, 1005, (2001)
- Opt. Commun.*
IF-2.3 2014 Quantum statistical properties of contradirectional Kerr couplers
G. Ariunbold and J. Perina, *Opt. Commun.* 176, 149 (2000)

- Acta Phys. Slov. Spec. Iss. IF-0.5* 2000 Pair-atomic effects in the micromaser
G. Ariunbold, J. Perina and Ts. Gantsog, Special Issue on Quantum Optics and Quantum Information, *Acta Phys. Slov.* 50, 507 (2000)
- Phys. Rev. A IF-3.0* 1999 Two-mode correlated states in cavity with injected atoms
G. Ariunbold, J. Perina, Ts. Gantsog and [F.A.A. El-Orany](#), *Acta Phys. Slov.* 49, 627 (1999)
- J. Opt. B IF-2.5* 1999 Nonclassical states in cavity with injected atoms
G. Ariunbold, J. Perina and Ts. Gantsog, *J. Opt. B: Quantum Semiclass. Opt.* 1, 219 (1999)
- Acta Phys. Slov. Spec. Iss. IF-0.5* 1998 Holstein-Primakoff SU(1,1) coherent state in the micromaser under intensity dependent Jaynes-Cummings interactions
G. Ariunbold, J. Perina and Ts. Gantsog, Special Issue on Quantum Optics and Quantum Information, *Acta Phys. Slov.* 48, 315 (1998).

CONFERENCE PROCEEDINGS WITH REVIEW COMMITTEE

- OPTICA Congress* 2022 A Statistical Chemical Analysis for Fixed Tissues
[B. Semon](#), M. Jaffe, H. Tsukamoto, L. Lu, and **G. O. Ariunbold**, The 2022 Imaging and Applied Optics Congress, 11-15 July 2022. ITh3D. Presented by B. Semon
- OPTICA ECBO* 2021 Rapid, Contact-Free, Multimodal, Non-Linear Optical Imaging for Collagen in Formalin-Fixed Paraffin-Embedded Tendon Tissues
[B. Semon](#), [A. Chriat](#), H. Wang, L. Priddy, L. Lu, M. Jaffe and **G. O. Ariunbold**, ECBO 2021 European Conferences on Biomedical Optics, June 20-24, 2021 (SPIE and OSA). Presented by B. Semon
- OPTICA Congress* 2021 Chemical Sensing via Resonant Deferred Signal Buildup
G. O. Ariunbold, [B. Semon](#) and [S. Nagpal](#), The OSA Optical and Sensing Congress, 19- 23 July 2021. AW5G.5. Presented by G. O. Ariunbold
- OPTICA CLEO* 2020 Cooperative Emissions from Hydrogen-Bonded Heterocyclic Organic Compounds
G. O. Ariunbold, [B. Semon](#), [S. Nagpal](#), and Y Rostovtsev, CLEO: Applications and Technology, (OSA, 2020), AW4K.4. Presented by G. O. Ariunbold
- OPTICA CLEO* 2018 Development of a Laser-induced Fluorescence Sensor Module used with Unmanned Aerials Vehicles
[S. Nagpal](#), [P. Adhikari](#), W. P. Williams, G. Windham, G. A. Matthews, and **G. O. Ariunbold**, CLEO 2018 OSA Technical Digest (online) (OSA, 2018), STU4P.5. Presented by S. Nagpal
- OPTICA FiO* 2018 Vibrational Spectroscopic Preliminary Study of Blood and Its Components in Mice
G. O. Ariunbold, [S. Nagpal](#), [P. Adhikari](#), E. Purevjav and L. Lu, in *Frontiers in Optics 2018*, OSA Technical Digest (online) (OSA, 2018), JTU2A.127. Presented by G. O. Ariunbold
- OPTICA FiO* 2018 Standoff microparticles characterization with digital holographic Raman spectroscopy

[N. R. Subedi](#), [G. O. Ariunbold](#), [P. Adhikari](#), and M. J. Berg, in *Frontiers in Optics 2018*, OSA Technical Digest (online) (OSA, 2018), JTuzA.111. Presented by G. O. Ariunbold

OPTICA
FiO

2017 Integrated Raman Spectroscopy with Digital Holography for
Microparticle Characterization

[N. R. Subedi](#), [P. Adhikari](#), and [G. O. Ariunbold](#), in *Frontiers in Optics 2017*, OSA Technical Digest (online) (OSA, 2017), FTh4B.4. Presented by G. O. Ariunbold

OPTICA
CLEO

2016 Early, in vivo Detection of Abiotic Plant Stress Responses via Raman
Spectroscopy

[N. Altangerel](#), [G. O. Ariunbold](#), [C. Gorman](#), D. Bohlmeier, J. Yuan, P. Hemmer, and M.O. Scully, CLEO 2016 OSA Technical Digest (online) (OSA, 2016), SF1H.3. Presented by G. O. Ariunbold

OPTICA
CLEO

2016 Coherent Stokes Raman Spectroscopy of Pyridine in Gas-Phase at Low
Temperature

[N. Altangerel](#), [G. O. Ariunbold](#), [Z. Yi](#), [T. Begzjav](#), E. Ocola, J. Laane, and M.O. Scully, CLEO 2016 OSA Technical Digest (online) (OSA, 2016), JTuzA.147. Presented by N. Altangerel

OPTICA
CLEO

2010 A Rapid Inspection of Quantum Interference using Superfluorescent
Picosecond Pulses

[G. O. Ariunbold](#), V. A. Sautenkov, and M. O. Scully, CLEO 2010 OSA Technical Digest (online) (OSA, 2010), CMA4. Presented by G. O. Ariunbold

OPTICA
CLEO/QELS

2010 Controlling Directionality of Mirror-less Lasing by Pulse Shaping and
Timing

A. V. Sokolov, [G. O. Ariunbold](#), [X. Wang](#), and M. O. Scully, CLEO/QELS: Laser Science to Photonic Applications, 2010 OSA Technical Digest (online) (OSA, 2010), QWA2. Presented by A. V. Sokolov

OPTICA
FiO

2008 Model Experiment for Stand-off Sensing

[G. O. Ariunbold](#), M. M. Kash, [H. Li](#), V. Sautenkov, Y. Rostovtsev, G. R. Welch, and M. O. Scully, in *Frontiers in Optics*, OSA Technical Digest (CD) (OSA, 2008), FThO6, October 19, 2008, Rochester, NY. Presented by G. O. Ariunbold

OPTICA
CLEO/QELS

2007 Monitoring Vibrational Wave Packet Dynamics via Direct Femtosecond
Pump-Probe Measurements

[D. Pestov](#), [G. O. Ariunbold](#), et al., Tech. Dig., CLEO/QELS, May 2007, Baltimore, MD. JTHD34. Presented by D. Pestov

OPTICA
CLEO/QELS

2007 Hybrid of Frequency and Time Resolved CARS

[D. Pestov](#), R. K. Murawski, [G. O. Ariunbold](#), et al., Tech. Dig., CLEO/QELS, May 2007, Baltimore, MD. CThY6. Presented by D. Pestov.

OPTICA
CLEO/QELS

2007 Detection of *B. subtilis* spores via Hybrid CARS

[D. Pestov](#), R. K. Murawski, [G. O. Ariunbold](#), et al., Tech. Dig., CLEO/QELS, May 2007, Baltimore, MD. PTuB4. Presented by D. Pestov.

OPTICA
CLEO/QELS

2006 From EIT photon correlations to Raman anti-correlations in coherently
prepared Rb vapor

V. A. Sautenkov, [G. O. Ariunbold](#), Y. V. Rostovtsev, and M. O. Scully, Tech. Dig., CLEO/QELS, May 2006, Long Beach, CA. QMD2. Presented by V. A. Sautenkov.