Vitae

ROBERT EDWIN PEALE

Associate Professor

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EDUCATION:

- Postdoctoral experience, 1989-1991, Lehigh University, "DX centers in AlGaAs," Advisor: G. D. Watkins.
- Ph.D. in Physics, 1990, Cornell University, Dissertation: "IR Studies of Chemical Splittings, Triplet Levels, and Tunneling States at Electronic Defects in Si," Advisor: A. J. Sievers.
- M.S. in Physics, 1986, Cornell University.
- B.A. in Physics, 1983, University of California, Berkeley

EMPLOYMENT:

- Associate Professor, Department of Physics, 1996 – present.
- Assistant Professor, Department of Physics, University of Central Florida, 1991-1996.
- Research Associate, Department of Physics, Lehigh University, 1989 to 1991.
- Research Assistant, Cornell Univ., Lab of Atomic and Solid State Physics, 1985-1989.
- Teaching Assistant, Cornell University, Department of Physics, 1983-1985.
- Technical Staff, Santa Barbara Research Center, detector characterization lab, 1982 and 1983.

AWARDS:

- Three time recipient of the NASA/ASEE Summer Faculty Fellowship.
- Winner of UCF Research Incentive Award April 2002.

EXTERNAL RECOGNITION

- 12 invitations to Colleges, Universities, and National Labs for public research presentations.
- 3 invited talks at topical conferences or workshops.
- 226 citations of published papers according to Web of Science.
- 4 invitations to NSF panel reviews.
- Chaired 3 conference sessions (SPIE, OSA, and Gordon Conferences).

PROFESSIONAL AFFILIATIONS

- American Physical Society
- American Association for the Advancement of Science
- Optical Society of America

TEACHING

Classroom instruction

- University Physics I (5 times)
- College Physics II (3 times)
- Quantum mechanics I and II (4 times)
- Thermal Physics (4 times)
- Classical Mechanics (1 time)
- Electronics (3 times)
- Graduate Summer Research Seminar (1 time).
- Teaching evaluations are above average for the UCF Department of Physics.

Extensive research supervision and training

- 3 Postdoctoral Research Associates supervised.
- 3 PhD degree dissertations supervised.
- 2 PhD dissertations in progress.
- 2 MSc theses supervised.
- 13 Undergraduate research projects supervised.
- Served on 8 PhD dissertation committees in Physics, Engineering, and Optics.
- Served on 2 MS thesis committees in Physics and Chemistry.

Course and program creation

- Led recent PhD and MSc program revisions as graduate coordinator,
- Led creation of Materials Physics Track as graduate coordinator.
- Created summer research seminar as part of required graduate core.
- Recruitment efforts netted substantial increase in graduate enrollment, higher quality of recruits, and higher percentage of in-state enrollment.

Postdoctoral Research Associates Supervised

1. Dr. Andrei Muravjov, from Institute for Physics of Microstructures, Russian Academy of Sciences, Nizhny Novgorod, *"Experimental studies of the far-infrared p-Ge laser,"* 1997-present.
2. Dr. Remco Strijbos, from Technical University of Delft, The Netherlands, *"Theoretical studies of far-infrared emission in p-type Germanium"* (1997-1999).
3. Dr. Elena Flitsiyan, UCF Adjunct Professor*, "Neutron transmutation doping of p-Ge laser material*" (2000-present).

PhD Dissertations Supervised

1. Kijun Park, *"Studies of far-infrared/submillimeter p-type germanium laser"* (1997). Current Employer: Korea Electric Power Research Institute.
2. Henry Weidner *"Energy transfer in Nd:KLiYF5"* (1998). Current Employer: Veeco, AFM design.
3. Sandra Withers, *"Lanthanide-Calcite Interactions,"* Defense in September 2002, Accepted future employment, SBIR mill in College Station TX.

PhD dissertations in progress

1. Eric Nelson, *"Transmutation-doped far-IR p-Ge laser,"* Degree expected in 2003.
2. Todd Dubosq, "*Continuous tunability for the far-IR p-Ge laser,"* Degree expected in 2004.

Masters Theses Supervised

1. Ray Ramotar, "*Fourier-transform spectroscopy of the triply-ionised lanthanides in lithium yttrium fluoride ($LiYF_4$) and barium yttrium fluoride (BaY_2F_8)*" (1992).
2. Chris Fredricksen, "Spectroscopy of S_2 microwave-sustained discharges," (1998).

Undergraduate Research supervised

1. Patrick Summers, *"Site-selective photoluminescence spectroscopy of Nd^{3+} in $KLiYF_5$"*
2. Harold Williamson, *"Transfer optics for external chamber to Fourier spectrometer."*
3. James Chung, *"Nitrogen laser pumped dye laser"*
4. Bill McClintic, *"Photoluminescence and IR absorption spectroscopy of porous Si"*
5. Matt McKaig, *"Ultraviolet Fourier transform spectroscopy of Nd^{3+} and Gd^{3+} doped fluoride crystals"*
6. Diana Downing, *"Luminescence dynamics of Er^{3+} in K_2YF_5"*
7. Dan Vantoff, *"Spectroscopy of Nd^{3+} in $CsGd_2F_7$"*
8. Alan Jamison, *"Electronics for whisker-contacting a far-infrared Schottky detector"*
9. William Trimble, *"Design and testing of a 100 W pulsed 450 MHz generator"*
10. Sandy Withers, *"Photoluminescence of GaAs/AlGaAs Multiple Quantum Wells"*
11. Alex Knoller *"Reflectance Modulation Spectroscopy"*
12. Jeff Donahue, *"Refocus Microscope for Depth Measurement"*
13. Patty Sharek, "*Computer control and data acquisition for grating spectrometer.*"

PhD dissertation committees

1. Margaret T. Perozzo "*Exciton saturation and spin relaxation in GaAs multiple quantum wells"* (1995)
2. Nicholas Madamopoulos, *"Ferroelectric liquid crystal device based photonic controllers for microwave antenna arrays"* (1998).
3. Adam L. Martin, "*Solid state microwave power amplifiers based on an extended resonance technique"* (1999).
4. Isaiah Olatunde Oladeji, *"Chemical bath deposition of II-VI compound thin films*" (1999).
5. Alexandra Rapaport "*The unsuspected role of stimulated emission in fluorescence dynamics"* (1999.)
6. Xiaomin Yang, "*Advanced RF IC Design for wireless communications*" 2001 (ECE).
7. Christian Kaiser, "*X-ray source for photolithography*" (2001)
8. Larry Shaw, "*Micromachining with femtosecond lasers*" (2001).
9. Javier Gonzalez, "*Antenna-coupled infraed focal plane arrays*" (Dissertation proposal 2002).

MS thesis committees

1. Asoka Pieris, *"Pressure dependence of Mossbauer shift for Fe-Ni alloy"* (1996).
2. Craig Perkins, "*Photo dissociation of polycyclic aromatic hydrocarbons above 9 eV."*

SERVICE

Physics Department Graduate coordinator since 2000

- Initiated a recruitment effort that monotonically increased graduate enrollments by a factor of 3.5 in two years.
- Increased in-state enrollments from 0% in 2000 to 71% in 2002.
- Increased average general GRE score of incoming class from <1100 to >1200.

Other committee assignments

- Department Tenure and Promotion Committee
- Search Committees
- Library Liaison
- Space Committee

Conference session chair

1. SPIE Photonics West, Terahertz spectroscopy and applications, "Direct Detectors of THz radiation," San Jose CA January 1998.
2. OSA Conference on Advanced Semiconductor Lasers and Their Applications, "Quantum Cascade and Interband IR Lasers," Santa Barbara CA July 1999.
3. Gordon Conference on Vibrational Spectroscopy, "THz spectroscopy," Newport RI, Aug 2000.

NSF panel reviews

- Electronics, waves, and beams, SBIR panel, May 1996.
- Electronics, waves, and beams, Equipment proposals, May 1998.
- Electronics, Photonics, and Device Technologies Program, Electrical and Communications Systems Division, CAREER proposals, Nov 1999.
- Optoelectronics & Photonics Panel, May 2000.

Reviewer of journal submissions

- Physical Review
- Physical Review Letters
- Journal of Applied Physics
- Applied Physics Letters
- Journal of Luminescence
- Applied Optics.

RESEARCH FUNDING

Active generation of research ideas and proposals

- Submitted 64 proposals from UCF for a total request exceeding $15 million since 1991.
- Submitted SBIR/STTR proposals from Zaubertek for a total request exceeding $2.4 million since 1999.

Winner of substantial funding for research, training, and partnership

- Raised $836,259 in external basic research funding to UCF as sole investigator.
- Raised additional $591,779 in external industrial R&D contracts to UCF as sole investigator.
- Zaubertek won $770,000 in SBIR/STTR Phase I and Phase II funding since 2000 under Dr. Peale's leadership as founder, president, and CEO.

Basic research grants

1. AFOSR (1994) $54,887, *"Time resolved site-selective Fourier-transform spectroscopy of dynamic processes in laser crystals."*
2. AFOSR (1996) $51,123, *"Event-locked time-resolved Fourier Spectroscopy for ns dynamic processes."*
3. NSF (1996) $206,000, *"Mode-locked, high power semiconductor FIR/sub-mm laser."*
4. NASA (1996) $87,640, *"Fourier-transform spectrometer"*
5. AFOSR/BMDO (1997) $55,850 *"Mode-locked semiconductor THz Laser"*
6. Pacific Northwest Nat. Lab (1999) $78,661 *"Contaminant-Carbonate Interactions."*
7. NSF (2000) $210,000, *"Continuous Wave Semiconductor Laser at Terahertz Frequencies."*
8. UCF (2000) $26,248, *Matching funds for #7.*
9. AFOSR (2001), $65,850, *"Widely Tunable and High Duty Terahertz p-Ge Laser in a Closed Cycle Refrigerator."*

Industrial Partnerships

1. The Analytic Sciences Corporation, (1992) $5,004, *"IR spectra of selected gases and vapors"*
2. INET (1995) $13,000, *"High resolution spectroscopy of hydrazine compounds from 1 to 20 μm."*
3. Aerojet (1999) $32,419 *"Insitu contamination monitor for SBIRS satellite."*
4. Korea Electric Power Res. Inst. (1997) $54,545, *"Spectroscopic studies of sulfur microwave discharges."*
5. Bell Technologies, Inc. (1999) $48,542, *"Sputter deposition of InAs thin films."*
6. Lucent Microelectronics(1999) $22,000, *"BiCMOS process integration."*
7. Zaubertek/AFOSR STTR Phase I subcontract (2001) $30,000 *"Tunable and Mode-locked p-Ge THz Laser."*
8. Zaubertek/ BMDO-SMDC SBIR Phase I subcontract (2001) $21,734 *"Gain, Power, and Duty Enhancement for the Far-infrared p-Ge laser by Neutron Transmutation Doping."*

9. Zaubertek/ AFOSR Phase II subcontract (2002) $167,000*, "Terahertz Devices: Tunable and Mode-locked p-Ge Terahertz Laser*."

Other funding

- UCF start-up funds, in-house grants, and match: $308,000
- NASA/ASEE Summer Faculty Fellowships at Kennedy Space Center ($36,000 total)
    1. *"Schlieren optics for leak detection"* (1995)
    2. *"Use of Bacteriorhodopsin as an adaptive spatial optical filter"* (1996)
    3. *"Quantitative IR thermography"* (1998)

RESEARCH ACCOMPLISHMENTS

Far-infrared semiconductor laser

Starting at UCF in 1991, Dr. Peale established a laboratory to develop and test far-infrared semiconductor lasers based on hot-holes in p-type germanium. He demonstrated the first operating p-Ge laser in the US (published 1996). Since then his lab has produced a steady output of practical and fundamental developments regarding this technology, including short-pulse generation/modulation, tunable wavelength selective cavities, and innovative gain media (delta-doped and transmutation doped germanium). The work is multidisciplinary and draws on the fields of nuclear science, solid-state physics, semiconductor technology, optics, laser engineering, radio-frequency electronics, low temperature techniques, far-infrared spectroscopy, and computer simulation of carrier dynamics in semiconductors. This work has been supported by two NSF awards and subcontracts from SBIR/STTR technology-transfer projects.

Mineral/metal interactions.

Since 1998, Dr. Peale has investigated the interaction between metal ions and geologic minerals, with important implications for a variety of environmental remediation efforts. Solution-grown and doped minerals are characterized by x-ray crystallography, low-temperature absorption and micro-luminescence spectroscopy, Rutherford back scattering, secondary-ion mass spectrometry, scanning electron microscopy with energy dispersive analysis, extended x-ray fine-structure analysis, and x-ray microprobe imaging. Results show that Calcite takes up Nd^{3+} with a local structure similar to hydrated Nd-carbonate. This implies a higher dissolution rate that would occur for perfect calcite local structure, with implications for the long term fate and transport of the similar radionuclides Pu^{3+}, Am^{3+}, and Cm^{3+} in nuclear waste streams. The work is a DOE-funded interdisciplinary collaboration with Pacific Northwest National Lab, Brookhaven National Lab, Argonne National Lab, and SUNY Stony Brook.

Rare-earth activated laser crystals

Starting in 1991, Dr. Peale pioneered the application of high-resolution Fourier spectroscopy to site-selective photoluminescence of low-symmetry multi-site rare-earth activated laser crystals. This technique was combined with crystal field analysis performed in a cubic, rather than the traditional spherical, basis, which allowed an interpretation of the differences for the fitting parameters between crystals with different site symmetries. This work was supported by an equipment grant from the Air Force.

Time-resolved Fourier spectroscopy

To study energy transfer phenomena in multi-site and upconversion laser crystals, Dr. Peale developed a time-resolving accessory for standard continuous-scan Fourier spectrometers. This resulted in a patent and the founding by Dr. Peale of Zaubertek, Inc. to serve as a vehicle for technology transfer. The resulting spectrometer accessory, "Event-Locked Fourier Spectroscopy," is sold under license from UCF as "ELFS40". Four have been sold to users of Bomem DA Fourier spectrometers. ELFS40 continues to play an important role in Dr. Peale's lab for the characterization of low duty infrared sources, such as the p-Ge laser. The original development was supported by AFOSR.

Technology Transfer

UCF has a mission to be "America's leading partnership university". Creation of small companies by faculty for commercial development of UCF-owned intellectual property has been encouraged by the creation of a technology incubator in the adjacent research park. Dr. Peale has participated in this movement by founding Zaubertek (See www.zaubertek.com), which has opened the door to the SBIR/STTR technology development world. This has proven true not only for Dr. Peale's innovations, but also for those of other current and former members of the UCF physics department. Since 2000, Zaubertek has won $770,000 in Federal SBIR/STTR awards, with $250,000 in subcontracts awarded to UCF. All awards to date have been for Dr. Peale's p-Ge terahertz laser development, however still-pending proposals have been submitted on a broad range of topics, including applications of nuclear technology, far-IR detectors, and AlGaN UV photodetectors.

Schlieren Optics

During summer faculty fellowships at NASA-KSC, Dr. Peale developed a method for single-ended schlieren imaging of phase objects and an adaptive schlieren system using optical write/read/erase spatial filters made from bacteriorhodopsin films.

Defects in Semiconductors

Prior to becoming an Assistant Professor in 1991 at UCF, Dr. Peale's research efforts were in the area of defects in semiconductors. His primary experimental approach was low temperature high-resolution perturbation spectroscopy and magnetic circular dichroism. His work revealed the magnetic properties of spin-triplet states for double donors in silicon and symmetry properties of (H,Be) tunneling centers in silicon. His work on the Te-related DX center in AlGaAs gave strong support to the negative-U model for the DX ground state and showed that the involved lattice distortion was not symmetry lowering.

Publication summary

- 90 research publications and patents.
- 42 peer-reviewed articles in top journals since 1986.
  - 10 as first author.
  - 28 as group leader.
- 45 conference publications.
- 3 US patents.

REFEREED JOURNAL PUBLICATIONS by RESEARCH AREA

Defects in Semiconductors

1. *"Incoherent saturation study of the selenium donor in AlSb,"* R. E. Peale, K. Muro, J. T. McWhirter and A. J. Sievers, Sol. State Comm. 60, 753 (1986).
2. *"Infrared spectral hole burning of sulfur-hydrogen deep donors in a Si:Ge crystal,"* S. P. Love, K. Muro, R. E. Peale and A. J. Sievers, Phys. Rev. B 36, 2950 (1987).
3. *"Zeeman splitting of double-donor spin-triplet levels in silicon,"* R. E. Peale, K. Muro, A. J. Sievers and F. S. Ham, Phys. Rev. B 37, 10829 (1988).
4. *"Infrared study of (H,Be)-, (D,Be)- , and (Li,Be)-acceptor complexes in silicon,"* R. E. Peale, K. Muro, and A. J. Sievers, Phys. Rev. B 41, 5881 (1990).
5. *"Magneto-optical properties of the DX center in $Al_{0.35}Ga_{0.65}As$:Te,"* R. E. Peale, Y. Mochizuki, H. -J. Sun, and G. D. Watkins, Semiconductor Science and Technology 6, B92 (1991).
6. *"Passivation of shallow impurities in Si by annealing in H_2 at high temperature,"* I. A. Veloarisoa, M. Stavola, D. M. Kozuch, R. E. Peale, and G. D. Watkins, Appl. Phys. Lett. 59, 2121 (1991).
7. *"Optical detection of EPR and electron-nuclear double resonance for substitutional Mn(d5) in InP:Sn,"* H. J. Sun, R. E. Peale, and G. D. Watkins, Phys. Rev. B 45, 8310 (1992).
8. *"Absence of dichroism for the DX optical-bleaching transients in $Al_{0.35}Ga_{0.65}As$:Te,"* R. E. Peale, H. -J. Sun, and G. D. Watkins, Phys. Rev. B15, 3353-9 (1992).
9. *"Magnetic circular dichroism of the DX center in $Al_{0.35}Ga_{0.65}As$:Te,"* R. E. Peale, Y. Mochizuki, H. -J. Sun, and G. D. Watkins, Phys. Rev. B15, 5933-43(1992).
10. *"Photoluminescence studies of thermally impurity diffused porous silicon layers,"* K. B. Sundaram, S. A. Ali, R. E. Peale, and W. A. McClintic, Jr., J. Materials Science: Materials in Electronics 8, 163-169 (1997).

Rare-earth activated laser crystals

11. *"Spectroscopy and Laser Performance of Nd Doped Gadolinium Lithium Fluoride,"* X. X. Zhang, Z. B. Villaverde, M. Bass, B. H. T. Chai, H. Weidner, R. I. Ramotar, and R. E. Peale, J. Appl. Phys. 74, 790 (1993).
12. *"Interpretive crystal-field analysis: Application to Nd^{3+} in YVO_4, and in $GdVO_4$,"* F. G. Anderson, P. L. Summers, H. Weidner, and R. E. Peale, Phys. Rev. B 50, 14 802 (1994).
13. *"Spectroscopy and crystal-field analysis for Nd^{3+} in $GdLiF_4$,"* F. G. Anderson, H. Weidner, P. L. Summers, and R. E. Peale, J. Luminescence 62, 77 (1994).
14. *"Effect of Gd^{3+} substitution for Y^{3+} in $YLiF_4$, $KLiYF_5$, and YVO_4,"* F. G. Anderson, H. Weidner, P. L. Summers, R. E. Peale, X. X. Zhang, and B. H. T. Chai, J. Luminescence 60&61, 150(1994).
15. *"Temperature and Concentration Dependances of Ho^{3+} to Yb^{3+} Energy Transfer in Yb^{3+}, Ho^{3+} Codoped KYF_4,"* X. X. Zhang, P. Hong, M. Bass, R. E. Peale, H. Weidner, and B. H. T. Chai, J. Luminescence 60&61, 878(1994).
16. *"Spectroscopy of Nd^{3+} in $KLiYF_5$ and $KliGdF_5$,"* P. L. Summers, H. Weidner, R. E. Peale, and B. H. T. Chai, J. Appl. Phys. 75, 2184-2188 (1994).
17. *"Site Selective Spectroscopy of Ho^{3+}:KYF_4,"* R. E. Peale, H. Weidner, P. L. Summers, and B. H. T. Chai, J. Appl. Phys. 75, 502-505 (1994).

18. *"Site selective spectroscopy and crystal field analysis of Nd^{3+} in strontium fluorovanadate,"* R. E. Peale, P. L. Summers, H. Weidner, and C. A. Morrison, J. Appl. Phys. 77, 270 (1995).
19. *"Spectroscopic characteristics of Nd^{3+} doped strontium fluorovanadate and their relationship to laser performance,"* P. Hong, X. X. Zhang, R. E. Peale, H. Weidner, M. Bass, and B. H. T. Chai, J. Appl. Phys. 77, 294 (1995).
20. *"Diode-pumped self-frequency doubling in a Nd^{3+} :$YCa_4O(BO_3)_3$ laser,"* J. M. Eichenholz, D. A. Hammons, L. Shah, Q. Ye, R. E. Peale, M. Richardson, and B. H. T. Chai, Applied Physics Letters 74, 1954-1956 (1999)
21. *"Laser Action in Yb^{3+}:YCOB (Yb^{3+}:$YCa_4O(BO_3)_3$),"* D. A. Hammons, J. M. Eichenholz, Q. Ye, B. H. T. Chai, L. Shah, R.E. Peale, M. Richardson, and H. Qiu, Optics Communications 156, 327-330 (1998).
22. *"Laser tunability in Yb^{3+}: $YCa_4O(BO_3)_3$ (Yb:YCOB),"* Shah L, Ye Q, Eichenholz JM, Hammons DA, Richardson M, Chai BHT, Peale RE, OPT COMMUN 167: (1-6) 149 (1999).
23. *"Simultaneous cw dual-wavelength laser action and tunability performance of diode-pumped Yb^{3+}: $Sr_5(VO_4)_3F$,"* Bustamante ANP, Hammons DA, Peale RE, Chai BHT, Richardson M, Chin A, OPTICS COMMUNICATIONS 192 (3-6): 309-313 JUN 1 2001

Mineral/metal interactions

24. "*Broad distribution of crystal field environments for Nd^{3+} in Calcite*," S. H. Withers, R. E. Peale, A. Schulte, G. Braunstein, K. M Beck, W. P. Hess, and R. J. Reeder, submitted to Phys. Chem. Minerals July 2002.

Schlieren Optics

25. *"Zebra schlieren optics for remote leak detection,"* R. E. Peale and P. L. Summers Applied Optics 35, 4518 (1996).
26. *"White light schlieren optics using bacteriorhodopsin as an adaptive image grid,"* R. E. Peale, A. B. Ruffin, and J. E. Donahue, Applied Optics 36, 4446 (1997).

Time-resolved Fourier-transform spectroscopy

27. *"Time-resolved Fourier spectroscopy for activated optical materials,"* H. Weidner and R. E. Peale, Applied Optics 35, 2849 (1996).
28. *"Time-Resolved Fourier Spectroscopy for Phosphor Characterization,"* H. Weidner, C. J. Schwindt, and R. E. Peale, Journal of the Society for Information Display 4/ 3, 177-181 1996.
29. *"Event-locked time-resolved Fourier Spectroscopy,"* H. Weidner and R. E. Peale, Applied spectroscopy 51, 1106 (1997)
30. *"Transient event-locked Fourier spectroscopy,"* H. Weidner and R. E. Peale, J. Lumin. 72-74, 1020 (1997).
31. *"Quality Analysis for Least-Squares Transformation of Unevenly Spaced Interferograms,"* H. Weidner and R. E. Peale, Applied spectroscopy 52, 587 (1998)

Far-infrared Semiconductor Lasers

32. *"Submillimeter p-Ge laser using a Voigt-configured permanent magnet,"* Kijun Park, R. E. Peale, H. Weidner, and J. J. Kim, IEEE J. Quantum Electronics 32, 1203-1210 (1996).
33. *"Evidence for self-mode-locking in p-Ge laser emission,"* A. V. Muravjov, R. C. Strijbos, C. J. Fredricksen, H. Weidner, W. Trimble, S. H. Withers, S. G. Pavlov, V. N. Shastin, and R. E. Peale, Appl. Phys. Lett. 73,3037 (1998).
34. *"Pulse separation control for mode-locked far-infrared p-Ge lasers,"* A. V. Muravjov, R. C. Strijbos, C. J. Fredricksen, S. H. Withers, W. Trimble, S. G. Pavlov, V. N. Shastin, and R. E. Peale, Appl. Phys. Lett. 74, 167-169 (1999).
35. *"Broad band p-Ge optical amplifier of terahertz radiation,"* A. V. Muravjov, S. H. Withers, S. G. Pavlov, V. N. Shastin, and R. E. Peale, J. Appl. Phys. 86, 3512 (1999).
36. *"Actively mode-locked p-Ge laser in Faraday configuration,"* A. V. Muravjov, S. H. Withers, R. C. Strijbos, S. G. Pavlov, V. N. Shastin, and R. E. Peale, Appl. Phys. Lett. 75, 2882 (1999)
37. *"Single axial-mode selection in a far-infrared p-Ge laser,"* A. V. Muravjov, S. H. Withers, H. Weidner, R. C. Strijbos, S. G. Pavlov, V. N. Shastin, and R. E. Peale, Appl. Phys. Lett. 76, 1996 (2000).
38. *"Piezo controlled intracavity wavelength selector for the far-infrared p-Ge laser,"* E. W. Nelson, A. V. Muravjov, S. G. Pavlov, V. N. Shastin, and R. E. Peale, Infrared Physics and Technology 42 (2): 107-110 2001.
39. *"High-resolution study of composite cavity effects for p-Ge lasers,"* E. W. Nelson, S. H. Withers, A. V. Muravjov, R. C. Strijbos, R. E. Peale, S. G. Pavlov, V. N. Shastin, and C. J. Fredricksen, IEEE Journal of Quantum Electronics 12, 1525-1530 (2001).
40. *"Far-infrared p-Ge laser with variable length cavity,"* A. V. Muravjov, E. W. Nelson, R. E. Peale, V. N. Shastin, and C. J. Fredricksen, Infrared Physics & Technology, in press 2002.
41. *"High field p-Ge laser operation in permanent magnet assembly,"* C. J. Fredricksen, E. W. Nelson, A. V. Muravjov, and R. E. Peale, Infrared Physics and Technology, in press 2002.
42. *"Neutron Transmutation Doped Far-infrared p-Ge laser,"* E. W. Nelson, E. S. Flitsiyan, A. V. Muravjov, R. E. Peale, S. H. Kleckley, W. G. Vernetson, submitted Applied Physics Letters, 2002.

Conference publications by research area

Defects in Semiconductors

1. *"Sulfur-hydrogen donor complexes in silicon,"* R. E. Peale, K. Muro and A.J. Sievers, in Shallow Impurities in Semiconductors, edited by G. Davies (Trans Tech, Zurich, 1990), pp. 151-156.
2. *"Zeeman splitting of double-donor spin-triplet levels in silicon,"* R. E. Peale, R. M. Hart, A. J. Sievers and F. S. Ham, in Shallow Impurities in Semiconductors, Inst. Phys. Conf. Ser. 95, pp. 89-92 (1989).
3. *"Magneto-optical properties of the DX center in $Al_{0.35}Ga_{0.65}As$:Te,"* R. E. Peale, Y. Mochizuki, H. -J. Sun, and G. D. Watkins, in D(X) Centers and Other Metastable Defects in Semiconductors, edited by R. A. Stradling and W. Jantsch,(IOP, Bristol 1991).
4. *"Passivation of shallow impurities in Si and GaAs by annealing in H_2,"* I.A. Veloarisoa, M. Stavola, D. M. Kozuch, R. E. Peale, G. D. Watkins, S. J. Pearton, C. R. Abernathy, and W. S. Hobson, Defects in Semiconductors, edited by G. Davies, G.G. Deleo, and M. Stavola (Trans Tech, Zurich, 1992, Mat. Sci. Forum 83-87, 905-910.
5. *"Photoluminescence studies on thermally impurity diffused porous silicon layers,"* K. B. Sundaram, S. A. Ali, R. E. Peale, and W. A. McClintic Jr., in Nanostructured Materials in Electrochemistry Symposium, (The Electrochemical Society 1995).

Rare-earth activated laser crystals

6. *"Comparison of Yb, Ho Upconversion Energy Transfer in Different Fluoride Crystals,"* X. X. Zhang, M. Bass, B. H. T. Chai, and R. E. Peale, in Advanced Solid State Lasers, edited by A. A. Pinto and T. Y. Fan, (Optical Society of America, Washington, DC 1993), pp. 253-257.
7. *"Comparative Fourier spectroscopy of Ho^{3+} and Yb^{3+} in KYF_4, BaY_2F_8, and $YLiF_4$,"* R. E. Peale, H. Weidner, P. L. Summers, X. X. Zhang, M. Bass, and B. H. T. Chai, in Advanced Solid State Lasers, edited by A. A. Pinto and T. Y. Fan, (Optical Society of America, Washington, DC 1993), pp. 450-453.
8. *"Comparison of Nd^{3+} in $GdLiF_4$ and $YLiF_4$ by Fourier spectroscopy,"* H. Weidner, R. E. Peale, X. X. Zhang, M. Bass, and B. H. T. Chai, in Advanced Solid State Lasers, edited by A. A. Pinto and T. Y. Fan, (Optical Society of America, Washington, DC 1993), pp. 55-58.
9. *"Energy transfer between two sites in Nd^{3+}:$KLiYF_5$,"* H. Weidner, P. L. Summers, R. E. Peale, and B. H. T. Chai, in New materials for advanced solid state lasers, edited by B. H. T. Chai, S. A. Payne, T. Y. Fan, A. Cassanho, T. H. Allik, (Materials Research Society, Pittsburgh, 1994), pp 135-140.
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3. *"The p-Ge laser: Physics of tunable emission near 100 microns,"* University of South Florida, Nov 1994.
4. *"New Techniques for studying energy-transfer phenomena in solids,"* Case Western Reserve University, Oct 1994.
5. *"Time-resolved Fourier-transform spectroscopy of impurities in fluoride crystals,"* Pacific Northwest National Lab Environmental Molecular Sciences Lab, May 1997
6. *"Mode-locked p-Ge lasers,"* Workshop on Semiconductor Infrared Detectors and Emitters, July 1997, Institute for Microstructural Sciences, National Research Council, Ottawa, Canada
7. *"Time-resolved Fourier transform spectroscopy,"* Chemistry Department Colloquium, Texas A&M University, Oct 1997
8. *"Mode-locked p-Ge laser,"* China Lake Naval Weapons Research Center, Dec 1997.
9. *"Faraday-configured mode-locked p-Ge laser and p-Ge far-infrared amplifier,"* OSA Advanced Semiconductor Lasers and their Applications, Santa Barbara, July 1999.
10. *"Event-locked method of gated and time-resolved Fourier spectroscopy,"* OSA Fourier Transform Spectroscopy: New Methods and Applications, Santa Barbara, June 1999.
11. *"Far-infrared p-Ge laser and proposals for p-Ge films,"* NRC Canada, Dec 2000.
12. *"The far-infrared p-Ge laser,"* Florida Memorial College Nov 2000.
13. *"The far-infrared p-Ge laser,"* Bethune Cookman College Nov 2000.
14. *"Broad distribution of crystal field environments for Nd3+ in Calcite,"* Eckerd College, Nov 2001.
15. *"Ions, minerals, and Nuclear Waste,"* Florida Institute of Technology, 29 March 2002.