

THE UNIVERSITY OF CONNECTICUT
BIOGRAPHY, BIBLIOGRAPHY AND PROFESSIONAL SUMMARY
OF
DOUGLAS M. PEASE, PROFESSOR
DEPARTMENT OF PHYSICS

REVISED 10/2000

DATE OF APPOINTMENT
1978

BIRTHDATE: 10/27/40 **BIRTHPLACE:** New Britain, Conn.

EDUCATION: B.A. 1962 Dartmouth
 M.A. 1965 University of Connecticut
 Ph.D. 1972 University of Connecticut

EXPERIENCE: 1971 Research Assistant II. University of
 Connecticut
 1972 Research Associate I. University of
 Connecticut
 1978 Assistant Professor, University of
 Connecticut
 1985 Associate Professor, University of
 Connecticut
 1994 Professor, University of Connecticut

PROFESSIONAL SOCIETIES: American Physical Society
 Sigma Pi Sigma

HONORS OR DISTINCTIONS: Award and certificates of recognition from NASA
for progress in x-ray based displacement and strain
measurements, 1996; Invitation only international
detector workshop to furnish a -
roadmap to novel detector development for
new generation synchrotron facilities, Washington ,D.C.
2000

FIELD OF SPECIALIZATION: Development of novel, x-ray related instrumental
techniques and apparatus.

RESEARCH INTERESTS: X-ray physics of condensed matter; emphasizing
the development of novel experimental techniques
and applications, and the study of alloy properties.

PUBLICATIONS:

- Pease, Douglas M. 1973. Experimental test of theories of extended x-ray-absorption-edge fine structure in metals. Phys. Rev. B7:3568-3572.
- Pease, Douglas M. and Leonid V. Azaroff. 1973. X-ray K absorption edges of alloys. IV. Mn solid solutions with Cu, Ni, Co, and Fe. J. Appl. Phys. 44:3419-3422.
- Pease, Douglas M. 1976. The thickness effect in X-ray absorption edges of metals and alloys. Applied Spectroscopy 30:405-410.
- Pease, Douglas M. and T.K. Gregory. 1976. A new comparison between experiment and theory for the x-ray K absorption edge of nickel. Solid State Communications 18:1133-1135.
- Szmulowicz, Frank and Douglas M. Pease. 1978. Augmented-plane-wave calculations and measurements of K and L x-ray spectra for solid Ni. Phys. Rev. B. 17:3341-3355.
- Pease, Douglas M., Leonid V. Azaroff, Canio Vaccaro and W.A. Hines. 1979. Electronic structure of ferromagnetic Ni-Al solid solutions. Phys. Rev. B19:1576-1581.
- Pease, Douglas M., and Leonid V. Azaroff. 1979. X-ray spectra of beta Ni-Al. J. Appl. Phys. 50:6605-6608.
- Cordts, Bernhard, Douglas M. Pease, and Leonid V. Azaroff. 1980. X-ray spectra, magnetic moments, and band theories of Cu-Ni alloys. Phys. Rev. B22:4692-4697.
- Cordts, Bernhard, Douglas M. Pease, and Leonid V. Azaroff. 1981. Difference between the local density of unoccupied states in Ag-Pd and Cu-Ni alloys. Phys. Rev. B24:538-543.
- Pease, Douglas M. 1980. Magnetic metals. Connecticut Journal of Science Education, Vol. 18:2-4. This article was republished in The Crucible, a journal of the Science Teachers Association of Ontario, 1981, Vol. 12:17-19.
- Wong, J., W.L. Roth, B.W. Batterman, L.E. Berman, D.M. Pease, S. Heald, and T. Barbee. 1981. Stability of some soft X-ray monochromator crystals in synchrotron radiation. Nuclear Instruments and Methods 195:133-139.
- Ford, J.C., W.A. Hines, J.I. Budnick, A. Paoluzi, D.M. Pease, L.T. Kabacoff, and C.V. Modzelewski. 1982. Spin-echo NMR study of the atomic site environments in the $\text{Fe}_{67}\text{Co}_{18}\text{B}_{14}\text{Si}_1$ metallic glass. J. Appl. Phys. 53:2288-2290.
- Choi, M., D.M. Pease, W.A. Hines, J.I. Budnick and G.H. Hayes. 1983. A study of the crystalline surface of Metglas 2605 CO. J. Appl. Phys. 54:4193-4196.

- Pease, D.M., G.H. Hayes, M. Choi, J.I. Budnick, W.A. Hines, R. Hasegawa, and S.M. Heald. 1984. On the density of unoccupied d states in transition metal-metalloid metallic glasses. *J. Non Crystalline Solids* 61 & 62:1359-1364. This article was chosen to be a technical memorandum for the Cornell High Energy Synchrotron Source: (CHESS technical memorandum #114).
- Pease, D.M., F. Szmulowicz and L.V. Azaroff. 1984. Smoothing of K edge X-ray fine structure in alloys of transition metals with aluminum. *Physics Letters*. 101A:38-40.
- Pease, D. M., F. Namavar, J. I. Budnick, M. Choi, J. Groeger, F. A. Otter, Y. Bruynseraede, and M. Clapp. 1984. Modifications in the unit cell geometry of sputtered niobium films caused by high energy ion bombardment. *Thin Solid Films* 120:239.
- Namavar, F., J. I. Budnick, A. Fasihuddin, H. C. Hayden, D. M. Pease, F. A. Otter, and V. Patarini. 1984. The influence of implantation conditions and target orientation in high dose implantation of Al⁺ into Si. *Mat. Res. Soc. Symp. Proc.* Vol. 27:347.
- Choi, M., D. M. Pease, W. A. Hines, G. H. Hayes, J. I. Budnick, S. M. Heald, R. Hasegawa, and H. E. Schone. 1985. Unoccupied-state electronic structure in (Ni_yPt_{1-y})₇₅P₂₅ and Ni_{100-x}P_x metallic glasses. *Phys. Rev. B* 32:7670.
- Pease, D.M., S.D. Bader, M.B. Brodsky, J.I. Budnick, T.I. Morrison, and N.J. Zaluzec. 1986. Anomalous L₃/L₂ white line ratios and spin pairing in 3d transition metals and alloys: Cr metal and Cu₂₀Au₈₀. *Physics Letters* A114, 491.
- Budnick, J. I., D. Pease, M. Choi, Z. Tan, F. Namavar, F. Sanchez, and H. Hayden. 1986. Krypton XANES studies in Implanted systems. *J. de Physique* C8 Suppl. No. 12 1053.
- Budnick, J. I., E. Klein, B. Illerhaus, M. Choi, G. Hayes and D. Pease. 1986. Difference in Fe atom environments between CuFe(2 percent Fe) and CuAuFe(1 and 3 percent) alloys. *J. de Physique* C8 Suppl. No. 12 1037.
- Budnick, J. I., M. Choi, D. M. Pease, Z. Tan. G. H. Hayes, E. Klein, and B. Illherhaus. 1986. Local structural and magnetic environments of iron in dilute alloys. *S.P.I.E.* Vol. 690, 58.
- Choi, M., J.I. Budnick, G.H. Hayes, D.M. Pease, S.M. Heald, D.E. Sayers, and R. Hasegawa. 1987. Extended x-ray absorption fine structure study of amorphous (Ni_xPt_{100-x})₇₅P₂₅ *Phys. Rev. B* 36, 285.
- Morrison, T.I., C.L. Foiles, D.M. Pease, and N.J. Zaluzec. 1987. Relationships between local order and magnetic behavior in amorphous Fe_{0.3}Y_{0.7}: extended x-ray absorption fine structure and susceptibility. *Phys. Rev.* B36, 3739.
- Hayes, G.H., J.I. Budnick, D.M. Pease, W.A. Hines, M.H. Choi, S.M. Heald, and D.E. Sayers. 1989. Study of metglas 2605 CO by extended and near edge x-ray absorption fine structure. *Journal of Magnetism and Magnetic Materials* 80, 371-378.

- Budnick, J.I., Z. Tan, and D.M. Pease. 1989. X-ray absorption studies of selective site substitution by 3d transition metals in Fe₃Si. *Physica* B158, 31-33.
- Pease, D.M., D.L. Brewes, Z. Tan, J.I. Budnick, and C.C. Law. 1989. Accurate x-ray absorption spectra obtained from concentrated bulk samples by fluorescence detection. *Phys. Lett.* A138, 230.
- Pease, D. 1989. *Physics of Magnetic Materials*. Conn. J. Sci. Ed. 26, 2, 1-4.
- Choi, M., J.I. Budnick, D.M. Pease, G.H. Hayes, and J. Wong. 1990. Method of obtaining the empirical scattering parameters for the Fe-B pair from the extended X-ray absorption fine structure data of Fe₂B: possible limitations. *Phys. Rev* B41, 9654.
- Tan, Z., J.I. Budnick, D.M. Pease, and F. Namavar. 1991. X-Ray Absorption Studies of Krypton Precipitates in Solid Matrices. *Phys. Rev.* B43, 1987-1992.
- Pease, D.M. 1991. L_{3,2} core hole lifetime widths of 3d transition metals. *Phys. Rev.* B44, 6708-6714.
- Jordan, E.H., H.A. Canistraro, D.M. Pease, and D.L. Brewes. 1991. Temperature displacement measurement using a scanning focussed X-Ray line source. *Advances in X-Ray Analysis* 34, 223-230.
- Choi, M., J.I. Budnick, D.M. Pease, G.H. Hayes, and S.M. Heald. 1991. Thermal variation of the mean-square relative displacement for the Pt-Pt pair in the Ni₁₀Pt₉₀ random solid-solution alloy. *Phys. Rev. B* 44, 9319.
- Canistraro, H.A., E.H. Jordan, D.M. Pease, and G.C. Fralick. 1992. X-ray based displacement measurement for hostile environments. NASA Technical Memorandum 10551, 1-15; also, Canistraro, H.A., E.H. Jordan, and D.M. Pease, X-ray based displacement measurement for hostile environments. *Experimental Mechanics*, 32, No. 4, 289-295.
- Brewes, D.L., C.E. Bouldin, D.M. Pease, J.I. Budnick, and Z. Tan. 1992. Silicon photodiode detector for a glancing emergence angle EXAFS technique. *Rev. Sci. Instrum.* 63, 3298-3302.
- Pease, D.M. 1992. L₃ to L₂ intensity ratios in soft X-ray valence band emission spectra of 3d transition metals. *Phys. Rev.* B46, 8790.
- Jordan, E., C. Ochi, D. Pease, and J. Budnick. Micro radiographic strain measurement using markers. *Experimental Mechanics*, 155, June 1994.
- Chartier, P., D. Brewes, M. Balasubramanian, T. Manzur, D. Pease, J. Budnick, L. Huang, C. Law, and S. Russell. 1994. Site selectivity in Fe doped β phase NiAl. *Journal of Applied Physics*, 75(8), 3842.
- Brewes, D.L., D.M. Pease, and J.I. Budnick. 1994. Residual distortion corrections with a glancing emergence angle EXAFS technique. *Phys. Rev.* B50, 9025.

- Balasubramanian, M., Y.D. Zhang, J.I. Budnick, K.E. Gonsalves, and T.D. Xiao. 1994. Studies on nanostructured M50 type steel using x-ray absorption spectroscopy and NMR. *Mat. Res. Soc. Symp. Proc.*, 195, 351.
- Balasubramanian, M., D.M. Pease, J.I. Budnick, T. Manzur, and D.L. Brew. 1995. Local environment of transition metal ternary dopants in β phase transition metal aluminides. *Physica B* 493, 208 and 209.
- Balasubramanian, M., Y.D. Zhang, J.I. Budnick, D.M. Pease. 1995. Local environment of Fe in nanostructured M50 type steel samples. *Nanostructured Mat.* 249, 5(2).
- Balasubramanian, M., D.M. Pease, J.I. Budnick, T. Manzur, and D.L. Brew. 1995. Site occupation tendencies for ternary additions (Fe, Co, Ni) in β phase transition metal aluminides. *Phys. Rev.* B51 (13), 8102.
- Pease, D.M., M. Balasubramanian, D.L. Brew, and J.I. Budnick. Enhanced intensity DAFS. *Proceedings of the XAFS workshop, Synchrotron Instru. Conf., SUNY, Stony Brook, NY, 1994.*
- Jordan, E., D.M. Pease, H.A. Canistraro, and N.C. Perry, Measurement of Mechanical Strain at Interior Locations. *CHES Newsletter*, 1995, 19-21.
- Zhang, Y.D., D.P. Yang, J.I. Budnick, W.A. Hines, W.Q. Xu, N.X. Shen, D.M. Pease, W.G. Fernando, and T.D. Xiao. 1995. On the nitrogen occupation in the Y_2Fe_{17} lattice. *Scripta Metall. et Materialia*, Vol. 33, Nos. 10/11, pp. 1817-1824.
- Balasubramanian, M., R. Lyver, J.I. Budnick, and D.M. Pease. 1997. Local structural order around dopant atoms in Fe and Co doped ternary alloys based on γNi_3Al . *Applied Physics Letters* 71, 3, 330-332.
- Balasubramanian, M., R. Lyver, J.I. Budnick, and D.M. Pease. 1997. Studies on the local structure of dilute 3d transition metal ternary dopants in $L1_2$ ordered Ni_3Al based alloys. *Journal de Physique IV (colloque)* 7, No. C2, pt. 2, 1043-1045.
- Brew, D., D.M. Pease, J.I. Budnick, and C.C. Law. 1997. Temperature dependent vibrational properties of $NiAl$, $CoAl$, and $FeAl$, β phase alloys. *Phys. Rev.* B56(18), 11, 449.
- Jordan, E., M. Gell, D. Pease, L. Shaw, D. Clarke, V. Gupta, B. Barber, and K. Vaidyanathan. 1997. Bond strength and stress measurements in thermal barrier coatings. *Proc. of ASME Turbo Expo '97 - Land, Sea, and Air, 42nd Gas Turbine and Aero Congress Exposition and Users Symposium, ASME number 97-6T-363.*
- Pease, D. and V. Krishnakumar. 1997. X-ray and neutron diffraction study of thermal barrier coating material. *Oak Ridge National Laboratory, High Temperature Material Laboratory Report Number 96-026.*
- Canistraro, H.A., E.H. Jordan, and D.M. Pease. 1998. Differential displacement measurement using scanning x-ray beams. *Review of Scientific Instruments*, 69(2), 452-456.
- Daniel, Million, M. Balasubramanian, D. Brew, M. Mehl, D. Pease, and J.I. Budnick. 2000. Site selectivity and bonding in the β phase aluminides: Studies of $RuAl$, $PdAl$, and Pd and Ru dopants in $NiAl$. *Phys. Rev.* B61, 6637 - 6644.
- Pease, Douglas, M. Daniel, J.I. Budnick, T. Rhodes, M. Hammes, D.M. Potrepka, K. Sills, C. Nelson, S.M. Heald, D.I. Brew, A. Frenkel, I.K. Grigorieva, and A.

Antonov, 2000, Log Spiral of Revolution HOPG Monochromator for Fluorescence XAFS, Rev. Sci. Instr. 71, 3267 - 3273.

D.M. Pease, M. Daniel, J.I. Budnick, B. Taylor, A. Frenkel, K. Pandya, I.K. Grigorieva, and A.A. Antonov, 2001, Extension of a tuned log spiral of revolution fluorescence XAFS detector, designed for optimal detection of a particular element Z, to XAFS of elements other than Z, Journal of Synchrotron Radiation 8, 336-338.

Douglas M. Pease, Abu Fasihuddin, Million Daniel, and Joseph I. Budnick, 2001, Method of linearizing the 3d L_3/L_2 white line ratio as a function of magnetic moment, Ultramicroscopy, in press.

D. Pease, M. Daniel, J. Budnick, A. Frenkel, and K. Pandya, 2001, Log spiral of revolution highly oriented graphite monochromator for fluorescence x-ray absorption edge fine structure, Instrumentation Scientific Highlight of the National Synchrotron Light Source, in press

D.M. Pease, M. Daniel, J.I. Budnick, S.M. Heald, D.L. Brewes, and A. Frenkel, 2001, Log spiral of revolution HOPG monochromator for fluorescence XAFS, Advanced Photon Source Activity Report, in press.

TEXTBOOK ARTICLES

Azaroff, Leonid V., and Douglas M. Pease. 1974. X-ray absorption spectra in X-ray Spectroscopy, ed. Leonid V. Azaroff, McGraw-Hill, 284-337.

Azaroff, Leonid V. and Douglas M. Pease. 1982. Electronic structure of metals and alloys in Advances in X-ray Spectroscopy, ed. C. Bonnelle and C. Mande, Pergamon Press.

ORAL PRESENTATIONS

New England Section of American Physical Society, Burlington, Vermont, 1972.

American Crystallographic Society, Storrs, Conn., 1973.

International Conference on the Physics of X-ray Spectra, National Bureau of Standards, Gaithersburg, MD, 1976.

March meeting of the American Physical Society, Chicago, IL, 1979.

Joint Solid State - Crystal Science Colloquium, Institute of Materials Science, Storrs, CT, 1980.

Poster demonstration at Gordon Conference on Electron Distributions and Chemical Bonding, Plymouth, NH, 1980.

March meeting of American Physical Society, Phoenix, AZ, 1981.

Invited seminar, Naval Surface Weapons Lab, Silver Spring, MD, 1981.

Invited seminar, Northeastern University, Boston, MA, 1983.

March meeting of the American Physical Society, Los Angeles, CA, 1983.

Poster demonstration at Fifth International Conference on Liquid and Amorphous Metals, Los Angeles, CA, 1983.

Invited Speaker, American Society for Metals, Detroit Meeting 1984.

High Temperature Alloys Conference, Wright Patterson Air Force Base, Dayton, Ohio 1988.

Invited Speaker, Argonne National National Laboratory, Argonne IL, 1985.

March Meeting of American Physical Society, St. Louis, MO, 1989.

Invited Speaker, United Technologies Research Center, E. Hartford, CT, 1989.

Invited Speaker, University of Vermont, 1992.

Invited Speaker, EXXON Corporation, 1992.

Invited seminar, Oak Ridge National Laboratory, 1995

Invited Speaker Annual Users Meeting and Workshop, National Synchrotron Light Source, 2000

Invited Speaker, EXXON Corporation, Clinton New Jersey, 2000

Invited speaker, National Synchrotron Light Source, 2001

CONSULTING

Jaycor Engineering, San Diego, California (instrumentation)

Spire Corporation, Bedford, Massachusetts

Advanced Fuel Research, East Hartford, Connecticut

Invited participant; International Working Group on Detectors for Synchrotron Based X-ray Physics; Washington, D.C. 2000

PATENTS

X-ray Extensometry: E. Jordan, D.M. Pease, and H. Canistraro.

A method of scanning x-ray mammography: H. Canistraro, E. Jordan, D. Pease

SCIENTIFIC PROGRAM

1. Atomic Structure in Refractory Alloys.

The local environment of ternary dopants in refractory alloys is being studied by x-ray absorption edge fine structure and x-ray diffraction. We are observing new types of local disorder in the vicinity of dopant alloy sites, in alloys for which dopant alloying additions can have a significant influence on practical alloy properties.

2. Development of Novel X-Ray Detection Methods for Synchrotron Based X-Ray Absorption Fine Structure Studies.

a. Methods are being developed for enhanced intensity diffraction anomalous fine structure spectroscopy.

b. Methods are being developed for enhanced x-ray absorption edge fine structure spectroscopy of environmental pollutants in waste dump soils.

3. Development of Laboratory X-Ray Diffractometer for the Study of Thermal Barrier Bond Coats. (With Mechanical Engineering and ORNL).

4. Development of L_3/L_2 white line ratios to characterize magnetic materials using transmission electron microscopy.