Prof. Ernesto Altshuler, PhD.: Curriculum Vitae

GENERAL INFORMATION

Birthdate : **15 October, 1963**

Current position: **Professor, Physics Faculty, University of Havana**

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WEBPAGE

http://www.complexperiments.net

EDUCATION

BSc. in Physics, University of Havana, 1986 (Summa Cum Laude).
Diploma Thesis: *Study of the M-Phase Ferrites Formation Reaction*

PhD. in Physics, University of Havana, 1994 (Summa Cum Laude).
Ph.D. Thesis: *Hysteresis, Relaxation and other Phenomena Associated to Flux Trapping in Ceramic Superconductors*

PROFESSIONAL EXPERIENCE

2000-present	Professor, Physics Faculty, University of Havana	Teaching, research in Superconductivity and Complex Phenomena
1999-2000	World Laboratory Fellow, Texas Center for Superconductivity, University of Houston	Research in Superconductivity and Complex Phenomena
1995-1999	Professor, Physics Faculty, University of Havana	Teaching in General Physics, research in Superconductivity
1989-1995	Researcher, Superconductivity Laboratory, IMRE, University of Havana	Teaching in General Physics, research in Superconductivity
1986-1989	Researcher, Development Division, “Frank País” Orthopedic Center, Havana	Research in Biophysics

PROFESSIONAL SOCIETIES

2003-present	Regular Associate, International Center for Theoretical Physics
2001-present	Regular member, American Physical Society
1986-present	Regular member, Cuban Physical Society

SCIENTIFIC INTERESTS

- Avalanche dynamics in diverse physical systems: from vortices in type II superconductors to sandpiles
- Granular matter
- Transport and magnetic properties of High Tc superconductors
- Statistical behavior of biological systems, especially ants and bacteria
- Physics teaching

OUTREACH OF E. ALTSHULER's RESEARCH

Beads get ball rolling on avalanche prediction, A. Ananthaswamy, *New Scientist,* 4 March 2009. *Review of paper published in Phys. Rev. Lett.* **102**: 078701 (2009)

G. W. Rusell, Agression in the Sports Wolrd –a Social Physiological Perspective (Oxford University Press, 2008). *Extensive mention of our studies of ants in panic*

MotionMountain-The Adventure of Physics (2006), Ch. Schiller. *Mention of our results in sand flows on pages 281-282.* (http://www.motionmountain.net

Small minds think alike, J. Ruvinsky, *Discover* vol. 26 No. 12 (Dec. 2005)

American Association of Physics Teachers Fall'2003 President's report (http://www.aapt.org/aboutaapt/reports/pres-fall03.cfm)

¡Viva la Ciencia!, R. Reid and B. Hayes , *American Scientist* (Sept-Oct 2004) (http://www.americanscientist.org/template/AssetDetail/assetid/35553)

SELECTED ACADEMIC HONOURS

Best Researcher under 40 in the Physical Sciences (2003, The Third World Academy of Sciences, Trieste, Italy)

Annual prizes to the Excellence of Scientific Research (2006, 2006, 2003, 2002, 2001 and 2000, Cuban Academy of Sciences)

Best Scientific Paper (2006, 2003, 2002, 2000 and 1994, University of Havana)

Scentific Work of the Highest Originality (2006, University of Havana)

Best PhD. Thesis in the Natural Sciences (1994, Nat. Board for Scientific Degrees)

"La Rosa Blanca" prize for Science Popularization (1994, UNEAC, Cuba)

SELECTED SCIENTIFIC MEETINGS

2009	Self-organization and dynamics of Active Matter (Paris, Jan. 26-30, 2009). **Speaker.**
2008	XXVI EFNNE (Recife, Nov. 5-8, 2008). Scheduled as **Plenary Speaker** (the other three are Leo Kadanoff, E. Dan Dahlberg and Anton Zeilinger)
2007	*First Workshop Rational Thinking vs. Pseudoscience, Rationalis'07*(Havana, Dec.17-19, 2007). **President of the Organizing Committee**
2006	*Second European Workshop of Scientific Computing Advanced training*, SCAT'06 (Paris, Sept. 26-29, 2006) [Invited (closing) speaker]
2005	First Latin American School and Conference on Statistical Physics and its Applications (Havana) [Speaker at the School and at the Conference] **Member of the Organizing Committee**
2004	International Workshop on Nanomagnetism (Havana) [Speaker] **Member of the Organizing Committee**
2004	Annual Meeting of the Norwegian Physical Society (Norway) [Invited speaker]
2003	7^{th} International Conference, Materials and Mechanisms of Superconductivity and High Temperature Superconductors (Rio de Janeiro) [Speaker] **Member of the Latin American Committee**
2001	VIII Workshop in Vortex Physics (by invitation)(S.C. de Bariloche)
2001	Fractal Structures and Self-Organization (Havana) [Speaker] **Organizer**
2001	Challenges in Granular Physics (ICTP, Trieste)
2000	6^{th} International Conference, Materials and Mechanisms of Superconductivity and High Temperature Superconductors (Houston)
1992	International Conference on Critical Currents (Vienna)

SELECTED SCIENTIFIC SEMINARS

2008	"Ants as Paradigm of Self Organization", Aula Magna de la Universidad de La Habana
2006	"Strange Phenomena in Cuban Sands", ESPCI, Paris
2003	"Symmetry breaking in escaping ants", ESPCI, Paris
2002	"Sandpile formation by revolving rivers", ESPCI, Paris (Host: Prof. J. E. Wesfreid)
2001	"Avalanche dynamics in 1D piles of beads", ESPCI, Paris (Host: Prof. J. E. Wesfreid)
2001	"Self organized criticality in vortex avalanches", Department of Physics, University of Oslo (Host: Prof. T. H. Johansen)
2000	"Some experiments in vortex avalanches", "James Franck Institute", University of Chicago (Host: Prof. H. Jaeger)

DIRECTION OF MSc. and PhD. DEGREES

2004	PhD Thesis “Characterization of zeolitic-origin materials with potential pharmaceutical applications” by A. Rivera
2003	PhD Thesis “Hysteresis and relaxation in the magnetic properties and transport critical current density YBCO, BSCCO, TBCCO and HgBCCO superconductors” by. A.J. Batista-Leyva
2003	MSc. Thesis: “Avalanche dynamics in one-dimensional sandpiles” by O. Ramos
2000	PhD Thesis “Computer simulations and criticality in type II superconductors” by R. Mulet
1999	MSc. Thesis “Cellular automata simulations in type II superconductors” by R. Cruz
1999	MSc. Thesis “Relaxation of the transport critical current in High T_c polycrystals” by R. Cobas
1996	PhD. Thesis “Field behavior of the transport critical current density of (Bi,Pb)-Sr-Ca-Cu-O superconducting ceramics”
1996	MSc. Thesis “Measurement and study of $J_c(H)$ and $J_c(T)$ curves in high temperature superconductors” by L.E. Flores
1996	MSc. “Some applications of the MonteCarlo method to the study of superconductors” by R. Mulet

ADVISING OF PhD. DEGREES

2007	MSc. Thesis: “Avalanches in self-organized critical systems: earthquake model and sandpile experiments” by O. Ramos [Director: K. J. Måløy]

10 MOST RELEVANT PAPERS

Avalanche prediction in a self-organized pile of beads
Ramos, O. , **E. Altshuler, E.** and K. J. Måløy
Physical Review Letters 102: 078701 (2009)

Quasiperiodic events in an earthquake model
Ramos, O. , **E. Altshuler, E.** and K. J. Måløy
Physical Review Letters 96: 098501 (2006)

Symmetry breaking in escaping ants
Altshuler, E., O. Ramos, Y. Núñez, J.Fernández, A. J. Batista-Leyva and C. Noda
The American Naturalist 166: 643 (2005)

Experiments in vortex avalanches
Altshuler, E. and T. H. Johansen
Reviews of Modern Physics, 76: 471 (2004)

Vortex avalanches with robust statistics observed in superconducting niobium
Altshuler, E., T. H. Johansen, Y. Paltiel, Peng Jin, K. E. Bassler, O. Ramos, Q. Chen, G. F. Reiter, E. Zeldov and C. W. Chu
Physical Review B 70: 140505 (R) (2004)

Sandpile formation by revolving rivers
Altshuler, E., O. Ramos, E. Martínez, A.J. Batista-Leyva, A. Rivera and K.E. Bassler
Physical Review Letters 91: 014501 (2003)

Avalanches in one-dimensional piles with different types of bases
Altshuler, E., Ramos, O., Martínez, C., Flores, L.E. and Noda, C.
Physical Review Letters 86: 5490 (2001)

Relaxation of the transport critical current High T_c polycrystals
Altshuler, E., Cobas, R., Batista-Leyva, A.J., Noda, C., Flores, L. E., Martínez, C. and Orlando, M.T.D.
Physical Review B 60: 3673 (1999)

Generation of Hysteresis $J_c(H_e)$ Curves in Ceramic $YBa_2Cu_3O_{7-x}$ Superconductors
Altshuler, E., Musa, J., Barroso, J., Papa, A.R.R. and Venegas, V.
Cryogenics 33: 308 (1993).

Flux Trapping in Transport Measurements of $YBa_2Cu_3O_{7-x}$ Superconductors: A Fingerprint of Intragrain Properties
Altshuler, E., García, S. and Barroso, J.
Physica C, 177: 61 (1991).

PUBLICATIONS LIST (June 2009)

Review articles

Experiments in vortex avalanches
Altshuler, E. and T. H. Johansen
Reviews of Modern Physics, 76: 471 (2004)

Vortex avalanches in type II superconductors: the sandpile perspective
Altshuler, E.
in Vlaev, Gaggero and Dvoeglazov (eds.) "Some Contemporary Problems of Condensed Matter Physics in Contemporary Fundamental Physics", Nova Science Publishers, 2001 (ISBN 156 072 8892)

Research articles in refereed journals

"Two-stage dissipation in a superconducting microbridge: experiment and modeling"
L. del Río, **E. Altshuler**, S. Niratisairak, O. Haugen, T. H. Johansen, B. A. Davidson, G. Testa and E. Sarnelli
Superconductor Science and Technology, 23: 085005 (2010)

Avalanche prediction in a self-organized pile of beads
Ramos, O. , **E. Altshuler, E.** and K. J. Måløy
Physical Review Letters 102: 078701 (2009)

Revolving rivers in sandpiles: from continuous to intermittent flows
E. Altshuler, R. Toussaint, E. Martínez, O. Sotolongo-Costa, J, Schmittbuhl and K. J. Måløy
Physical Review E 77: 031305 (2008)

Uphill solitary waves in granular flows
E. Martínez, C. Pérez-Penichet, O. Sotolongo-Costa, O. Ramos, K. J. Måløy, S. Douady and **E. Altshuler**
Physical Review E 75: 031303 (2007)

Measuring activity in ant colonies
Noda, C., J. Fernández, C. Pérez-Penichet, and **E. Altshuler**
Reviews of Scientific Instruments 77: 126102 (2006)

Quasiperiodic events in an earthquake model
Ramos, O. , **E. Altshuler, E.** and K. J. Måløy
Physical Review Letters 96: 098501 (2006)

Symmetry breaking in escaping ants
Altshuler, E., O. Ramos, Y. Núñez, J.Fernández, A. J. Batista-Leyva and C. Noda
The American Naturalist 166: 643 (2005)

Transport properties of YBCO, HBCCO, TBCCO and BSCCO superconduting polycrystals
A. J. Batista-Leyva, M.T.D. Orlando and E. **Altshuler**
Physica C 408-410: 585 (2004)

Experiments in superconducting vortex avalanches
E. Altshuler, T. H. Johansen, Y. Paltiel, Peng Jin, K. E. Bassler, O. Ramos, Q. Chen, G. F. Reiter, E. Zeldov and C. W. Chu
Physica C 408-410: 501 (2004)

Vortex avalanches with robust statistics observed in superconducting niobium
Altshuler, E., T. H. Johansen, Y. Paltiel, Peng Jin, K. E. Bassler, O. Ramos, Q. Chen, G. F. Reiter, E. Zeldov and C. W. Chu
Physical Review B 70: 140505 (R) (2004)

Sandpile formation by revolving rivers
Altshuler, E., O. Ramos, E. Martínez, A.J. Batista-Leyva, A. Rivera and K.E. Bassler
Physical Review Letters 91: 014501 (2003)

Josephson junctions in a magnetic field: insights from coupled pendula
Altshuler, E and R. García
American Journal of Physics 71: 405 (2003)

Hysteresis and relaxation in $TlBa_2Ca_2Cu_3O_y$ superconducting polycrystals
Batista-Leyva, A. J., Cobas, R., Orlando, M. T. D. and **Altshuler, E**
Superconductor Science and Technology 16 : 857 (2003)

The resistive transition of $(Hg_{0.85}Re_{0.15})(Ba_{1-y}Sr_y)_2Ca_2Cu_3O_{8+\delta}$ superconducting polycrystals
Batista-Leyva, A. J., Orlando, M. T. D., Rivero, L., Cobas, R. and **Altshuler, E**
Physica C 383/4 : 365 (2003)

Magnetic irreversibility in $(Hg_{1-x}Re_x)Ba_2Ca_2Cu_3O_{8+\delta}$: effects of neutron irradiation
Altshuler, E, Chu, C.W., Orlando, M.T.D. Sin. A., Batista-Leyva, A.J., Buntar, V. and Weber, H.
Physica C 371 : 224 (2002)

Origin of dendritic flux patterns in MgB_2 films
Baziljevich, M. , Bobyl, A. V., Shantsev, D. V., **Altshuler, E.**, Johansen, T. H. and Lee, S. I.
Physica C 369: 93 (2002)

Relaxation of the transport critical current in deoxygenated $YBa_2Cu_3O_{7-\delta}$
Cobas, R., Batista-Leyva, A.J., García, S. and **Altshuler, E.**
Physica C 366: 117 (2002)

Simple model for plastic dynamics of a disordered flux line lattice
Bassler, K.E., Paczuski, M. and **Altshuler, E**.
Physical Review B 64: 224517 (2001)

Avalanches in one-dimensional piles with different types of bases
Altshuler, E., Ramos, O., Martínez, C., Flores, L.E. and Noda, C.
Physical Review Letters 86: 5490 (2001)

Thermally activated avalanches in a type II superconductor.
Mulet, R., Cruz, R., and **Altshuler, E.**
Physical Review B 63:052507 (2001)

Time evolution of a natural clinoptilolite in aqueous medium: conductivity and pH experiments.
Rivera, A., Rodríguez-Fuentes, G. and **Altshuler, E.**
Microporous and Mesoporous Materials 40:173 (2000)

Magnetic hysteresis of Re-doped HBCCO polycrystals
Altshuler, E., Batista-Leyva, A.J., Cobas, R. and Orlando, M.T.D.
Physica C 341-344:1841 (2000)

Hysteresis of the critical current density in YBCO, HBCCO and BSCCO superconducting crystals: a comparative study
Batista-Leyva, A.J., Cobas, R., Estévez-Rams, E. Orlando, M.T.D., Noda, C. and **Altshuler, E.**
Physica C 331: 57 (2000)

Universality of vortex avalanches in a type II superconductor with periodic pinning
Cruz, R., Mulet, R. and **Altshuler, E**.
Physica A 275: 15 (1999)

Relaxation of the transport critical current High T_c polycrystals
Altshuler, E., Cobas, R., Batista-Leyva, A.J., Noda, C., Flores, L. E., Martínez, C. and Orlando, M.T.D.
Physical Review B 60: 3673 (1999)

Magnetic hysteresis of the zero-resistance critical temperature in YBaCuO, BiSrCaCuO and HgBaCaCuO superconducting polycrystals.
Batista, A., Cobas, R., D'Azeredo-Orlando, C., Noda, C. and **Altshuler, E.**
Physica C 314: 73(1999)

Characterization and Neutralizing Properties of a Natural Zeolite/Na_2CO_3 Composite Material
Rivera, A., Rodríguez, G. and **Altshuler, E.**
Microporous and Mesoporous Materials 24: 51 (1998)

Temperature Dependence of some Intergranular Parameters in BSSCO Polycrystalline Superconductors Obtained Through the Magnetic Hysteresis of J_c
Muné P., López, J. and **Altshuler, E.**

Physica C 292:48 (1997)

Choice of Sample Size for High Transport Current Density in a Granular Superconductor: Percolation versus Self-field Effects
Mulet, R., Díaz, O. and **Altshuler, E.**
Superconductor Science and Technology 10: 758 (1997)

The Azimuthal Critical State of a Superconducting Hollow Cylinder
Altshuler, E. and Mulet, R.
Physica C, 292:39 (1997)

Avalanche behaviour in one-dimensional superconductors with a periodic distribution of pinning centers: a Monte Carlo approach
Mulet, R. and **Altshuler, E.**
Physica C, 281: 317 (1997)

Possible Interpretation of the Existence of an Anomalous Inversion of some ZFC and FC transport Characteristics in YBCO and BSCCO Ceramic Superconductors
López, J., Muné, P., García, S. and **Altshuler, E.**
Physica C, 272: 13 (1996).

AC-Susceptibility Study of the Intergranular Irreversibility Line in BSCCO Ceramic Superconductors
González, J.L, Muné, P., Flores, L. and **Altshuler, E.**
Physica C, 254: 76 (1995).

Bean-Livingstone Barriers in Ideal Type-II Superconductors: Hollow Cylinders
Mulet, R. and **Altshuler, E.**
Physica C, 252: 295 (1995).

On the Negative Values of the Geometric Factors in the Intragranular Flux Trapping Model and the Hysteresis in the $J_c(B_a)$ Dependence of Polycrystalline Superconductors
Muné, P., **Altshuler, E.** and Musa, J.
Physica C, 246: 55 (1995) .

Flux Creep Simulations in Hard Superconductors for Different Critical State Models
Mulet, R. and **Altshuler, E.**
Physica Status Solidi (b), 182: K31 (1994).

Hysteresis in the $J_c(B_a)$ Dependance of (Bi,Pb)-Sr-Ca-Cu-O polycrystalline superconductors
Muné, P. **Altshuler, E**., Musa, J., García, S. and Riera, R.
Physica C, 226: 12 (1994).

Magnetic Hysteresis of the Zero-Resistance Critical Temperature in $YBa_2Cu_3O_{7-x}$ Ceramic Superconductors
Flores, L., **Altshuler, E**., García, S. and Musa, J.
Physica C, 234: 368 (1994).

Generation of Hysteresis $J_c(H_e)$ Curves in Ceramic $YBa_2Cu_3O_{7-x}$ Superconductors
Altshuler, E., Musa, J., Barroso, J., Papa, A.R.R. and Venegas, V.
Cryogenics 33: 308 (1993).

Transport Relaxation and Intragranular Flux Creep in Polycrystalline $YBa_2Cu_3O_{7-x}$
Altshuler, E. and González, J.L.
Physica C, 200: 195 (1992).

The J_c vs. T dependence in YBaCuO superconductors and the Ambegaokar-Baratoff Relationship
Papa, A.R.R. and **Altshuler, E**.
Physica Status Solidi, 168: K15 (1991).

Flux Trapping in Transport Measurements of $YBa_2Cu_3O_{7-x}$ Superconductors: A Fingerprint of Intragrain Properties
Altshuler, E., García, S. and Barroso, J.
Physica C, 177: 61 (1991).

Anomalies in the J_c vs. B Curves from Oxalate Route Y-Ba-Cu-O Superconductors
Altshuler, E., Carrillo, D., Papa, A.R.R., Venegas, V., and Curbelo, C.
Physica C 172: 361 (1991)

J_c vs. B curves and the Josephson Junction Assembly Model for Y-Ba-Cu-O Superconductors
Papa, A.R.R. and **Altshuler, E.**
Solid State Communications 76: 799 (1990)

Hysteretic Critical Currents in Y-Ba-Cu-O Superconductors: a Microstructural Approach
Altshuler, E., García, S. and Aguilar, A.
Physica Status Solidi (a) 120: K169 (1990).

Biophysics in Orthopaedics (in Spanish)
Altshuler, E.
Cuban Journal of Orthopaedics and Traumatology, 5: 122 (1991).

Reactivity Study of Ferric Oxides from Different Origins
García, S. and **Altshuler, E.**
Physica Status Solidi (a), 97: K119 (1986).

Mössbauer Study of the Reaction Kinetics of Hexagonal M-phase Ferrites
García, S. and **Altshuler, E**.
Physica Status Solidi (a), 89: 427 (1985).

Research articles in refereed journals (conference proceedings)

High resolution thermal imaging of hotspots in superconducting films
O. Haugen, T. H. Johansen, H. Chen, V. Yurchenko, P. Vaser, D. Winkler, B. A. Davidson, G. Testa, E. Sarnelli and **E. Altshuler**
IEEE Transactions in Applied Superconductivity 17: 321 (2007)

Laser patterning: a new approach to measure local magneto-transport properties in multifilamentary superconducting tapes
C. F. Sánchez Valdés, C. Pérez-Penichet, C. Noda, M. Arronte, A. J. Batista-Leyva, O. Haugen, T. H. Johansen, Z. Han and **E. Altshuler**
Journal of Magnetism and Magnetic Materials 316: 930 (2007)

Experiments in superconducting vortex avalanches
Altshuler, E., T. H. Johansen, Y. Paltiel, Peng Jin, K. E. Bassler, O. Ramos, G. F. Reiter, E. Zeldov and C. W. Chu
Physica C, 408-410: 501 (2004).

Hysteresis and relaxation in HBCO, BSCCO, TBCCO and YBCO superconducting polycrystals
Batista-Leyva, A. J., Orlando, M. T. D. and **Altshuler, E.**
Physica C, 408-410: 585 (2004).

Hysteresis in the $I_c(H)$ Characteristics of High Temperature Superconducting Ceramics and Thin Films
Altshuler, E., Muné, P., Musa, J., González, J.L., Arés, O., and Hart, C.
Journal of Superconductivity, 6: 781 (1995).

Penetration of Circular Vortices into a Superconducting Hollow Cylinder
Altshuler, E. and Mulet, R.
Journal of Superconductivity, 8: 779 (1995).

Magnetic Hysteresis of the Zero-Resistance Critical Temperature in YBCO Granular Superconductors
Flores, L., **Altshuler, E.,** García, S. and Musa, J.
Journal of Superconductivity, 8: 603 (1995).

The Oxygen Isotope Effect in Pr, Ca and Zn Substituted $YBa_2Cu_3O_{7-x}$ and $EuBa_2Cu_3O_{7-x}$
Franck, J.P., Gygax, S., Soerensen, G., **Altshuler, E**., Hnatiw, A., Jung, J., Mohamed, M.A.-K, Sproule, G.I., Chrzanowski, J. and Irwin, J.C.
Physica C, 185-189: 1379 (1991).