

# Prof. Ernesto Altshuler, PhD.: Curriculum Vitae

## GENERAL INFORMATION

Birthdate : 15 October, 1963

Current position: Professor, Physics Faculty, University of Havana

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E-mails: [ea@infomed.sld.cu](mailto:ea@infomed.sld.cu) / [ealtshuler@fisica.uh.cu](mailto:ealtshuler@fisica.uh.cu)

## 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

## 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)

Scientific 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)

## 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, specially ants?
- Physics teaching

## SELECTED MENTIONS ON E. ALTSHULER’S RESEARCH

*¡Viva la Ciencia!*

R. Reid and B. Hayes

*American Scientist* (Sept-Oct 2004)

(<http://www.americanscientist.org/template/AssetDetail/assetid/35553> )

*American Association of Physics Teachers Fall’2003 President’s report*

(<http://www.aapt.org/aboutaapt/reports/pres-fall03.cfm>)

*Small minds think alike*

J. Ruvinsky

*Discover* vol. 26 No. 12 (Dec. 2005)

## SELECTED SCIENTIFIC MEETINGS

- 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<sup>th</sup> 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<sup>th</sup> International Conference, Materials and Mechanisms of Superconductivity and High Temperature Superconductors (Houston)
- 1992 International Conference on Critical Currents (Vienna)

## SELECTED SCIENTIFIC SEMINARS

- 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

## 10 MOST RELEVANT PAPERS (July 2007)

*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)

*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)

*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 (July 2007)**

### **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**

*Uphill solitary waves in granular flows*

E. Martínez, C. Pérez-Penichet, O. Sotolongo-Costa, O. Ramos, K. J. Maloy, 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 superconducting polycrystals

A. J. Batista-Leyva, M.T.D. Orlando y **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)

*Modelando vórtices de pancake a través de imanes*

L. del Río, C. Noda y **E. Altshuler**  
*Revista Cubana de Física B* 21: 41 (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/ $\text{Na}_2\text{CO}_3$  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  $J_c(B_0)$  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  $J_c(B_0)$  Dependence 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)

*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).