



Prof. Ernesto Altshuler: *Curriculum Vitae*

**Professor, Facultad de Física,
Universidad de La Habana**
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*

Doctor en Ciencias, University of Havana, 2019
Thesis: *Vórtices, granos y hormigas: experimentos en sistemas complejos*

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

SCIENTIFIC INTERESTS

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

FEATURING OF E. ALTSHULER'S RESEARCH

Cuban and American Physics, Sandra J. Ackerman, *American Scientist* vol. 104, No. 3, p. 142 (2016). A general account of Altshuler's scientific work.

(<http://www.americanscientist.org/issues/pub/cuban-and-american-physics>)

In from the cold, Richard Stone, *Science* **348**, 746 (2015). A general account on Altshuler's scientific work.

Particles defy gravity, float upstream, Andrew Grant, *Science News*, 13 July 2013. Review of the paper published in *Proy. Roy. Soc. A* **469**, 20130067 (2013)

Free-falling against the grain, Devin Powell, *Science News*, 5 June 2011.

Review on paper published in *Phys. Rev. Lett.* **106**, 218001 (2011)

(<http://www.sciencenews.org/view/generic/id/330783>)

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 World –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

Fellow, World Academy of Sciences (2021)

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

Annual prizes to the Excellence of Scientific Research (2020, 2016, 2006, 2003, 2002, 2001 and 2000, Cuban Academy of Sciences)

Best Scientific Paper (2020, 2016, 2014, 2006, 2003, 2002, 2000 and 1994, University of Havana)

BOOKS

E. Altshuler "Guerrilla Science; survival strategies of a Cuban physicist" (Springer, 2017)

Multi-author "1000 questions / 100 answers" (Encyclopedia of Scienc and Technology) ("F. Varela, 2017)

Multi-author "The History of Physics in Cuba" (Springer, 2015)

E. Altshuler "A través de los ojos" (Gente Nueva, 1993)

SELECTED SCIENTIFIC MEETINGS

2018 "Quantifying ants activity: from foraging to panic", en el "XLVII Winter Meeting on Statistical Physics" (Puebla, México, 7 – 10 enero 2018). **Invited Speaker**

2017 Statistical Physics Days (ESPCI) (January 2017) **Invited Speaker**

2016 CMD26 –Condensed Matter Division, European Physical Society (Groningen, 4 – 9 Sept., 2016) **Invited Speaker**

2015 Bifurcations and Instabilities in Fluid Dynamics (Paris, July 15-17, 2015) **Speaker**

2015 Complex matter Physics: active materials, dynamics and patterns (La Habana, June 24 – 26, 2015). **Organizer.**

2015	Granular Matter in Low Gravity (Erlangen, Germany, March 25 – 27, 2015) Keynote Speaker
2015	Geilo School “Cooperative particles: patchy colloids, active matter and nanofluids” (Geilo, Norway, March 16 -26, 2015) Lecturer
2014	Nordic Workshop on Soft Matter Physics (Oslo, Norway, 29-30 September, 2014) Invited Speaker
2014	Flows and clogging in bottlenecks: simulations and experiments (Zaragoza, Spain, September 17 – 19, 2014) Speaker
2013	XIII Latin American Workshop on Nonlinear Phenomena, LAWNP 2013 (Cordoba, Argentina, October 21-25, 2013) Invited speaker
2012	Gordon conference “Granular and granular-fluid flows” (Davidson College, NC, USA, 22-27 July, 2012). Plenary Speaker
2012	Complex matter Physics: materials, dynamics and patterns (La Habana, March 6 – 9, 2012). Organizer.
2012	2 nd International Workshop on Complex Physical Phenomena in Materials (Recife, Brasil, Jan. 31 – Feb. 3, 2012). Speaker.
2011	General Assembly of the International Union of Pure and Applied Physics (IUPAP) (London, UK, 31 Oct. – 4 Nov. 2011).
2011	Complex Phenomena in Superconductors and Magnetic Systems (Øystese, Norway, Aug. 29 – Sept. 2, 2011). Speaker.
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.
2007	<i>First Workshop Rational Thinking vs. Pseudoscience, Rationalis'07</i> (Havana, Dec.17-19, 2007). President of the Organizing Committee.
2006	<i>Second European Workshop of Scientific Computing Advanced training, SCAT'06</i> (Paris, Sept. 26-29, 2006). Closing speaker.
2005	First Latin American School and Conference on Statistical Physics and its Applications (Havana) Member of the Organizing Committee, and speaker.
2004	International Workshop on Nanomagnetism (Havana) Member of the Organizing Committee, and speaker.
2004	Annual Meeting of the Norwegian Physical Society (Norway) 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

2021	“Dropping intruders near a wall into granular matter” (Weminar at the Physics Department, Magdeburg University, June 28, 2021)
2020	“Repulsion and rotation: penetrating granular matter near a wall” (First in a series of weminars organized by the journal Granular Matter, August 28, 2020).
2019	“Penetration into confined granular matter” (PMMH-ESPCI Seminar, Paris, Oct 3, 2019)
2018	“Ants: from collective to individual behavior” (School of Engineering and Applied Science, Princeton University, USA, June 18, 2018).
2017	“Quantifying ants activity: from foraging to panic” (ILM, University of Lyon, France, July 17),
2015	“Living on the edge: bacterial traffic in confined flows” (Physics Department, University of Twente, The Netherlands, 5 August)
2014	“Extraterrestrial sink dynamics in granular matter” (PMMH-ESPCI, Paris, 13 Sept.)
2014	“Quantifying the dynamics of perturbed ants” (Physics Department, University of Pennsylvania, USA, 28 July).
2014	“Complexity and Dynamics in Ants” (Rockefeller University, USA, 18 July)

2014	"Falling, flowing and shaken granular matter" (Department of Biomedical Engineering, Rutgers University, USA, 13 Sept.)
2012	"The FABULAB Project: low budget experiments in the solar system" (IPGS, Lyon, France, 25 Sept.)
2012	"Flow controlled symmetry breaking of an active suspension through a funnel" (James Franck Institute, University of Chicago, USA, July 20).
2011	"Quantifying the dynamics of the Cuban ant <i>Atta Insularis</i> " (Department of Mathematics and Complexity & Networks Group, Imperial College London, Nov. 3)
2011	"Some open (and not so open) questions in the dynamics of the Cuban ant <i>Atta Insularis</i> " (Mathematics Department, Uppsala University, Oct. 17)
2011	"Ahorita...let's talk panic" (Center for Advanced Study of the Norwegian Academy of Sciences (CAS), Oct. 26).
2011	"Flow-induced symmetry breaking of an active suspension through a funnel", Colloquium at the Physics Department, Norwegian University of Science and Technology (NTNU), Sept. 30)
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)

SUPERVISION OF MSc. and PhD. DEGREES

2022	MSc Thesis "Penetration of intruders in granular media confined into a Hele-Shaw cell" by M. Espinosa-Cuartas
2019	MSc Thesis "Experiments in granular rectifiers" by F. Corrales-Machín
2019	MSc Thesis "Electric and magnetic properties of composite materials with highly non-homogeneous electrical conductivity" by A. S García-Gordillo
2018	PhD Thesis "Transport properties and compaction pressures in BSCCO superconductor ceramics", by A. Cruz
2018	MSc Thesis "Implementation of an experimental system for the study of free exploration of insects in non-confined regions" by A. Serrano
2018	MSc Thesis "Instrumental system for experimentation at different gravities" by G. Viera
2018	MSc Thesis "Transition from continuous to intermittent flows in granular piles" by L. Alonso
2016	PhD Thesis "Physics and Engineering of natural catastrophes: accelerometric and optical techniques to study the penetration of solid intruders into liquefied soils" by G. Sánchez-Colina
2015	MSc Thesis "Velocity gradients in confined granular flows" by E. Martínez
2015	MSc Thesis "Dynamics of ants in panic" by F. Tejera
2014	MSc Thesis "Anisotropy in BSCCO-Ag superconducting tapes" by A. Borroto
2013	MSc Thesis "Bacterial flows in microfluidic channels" by N. Figueroa
2010	MSc Thesis "Transition to dissipation in heterogeneous superconducting bridges" by L. del Río
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

EDITORIAL WORK

Editor in Chief, *Cuban Journal of Physics* (2009-today)

Member of the editorial board, *Physical Review Applied* (2016-today)

Member of the editorial board, *Granular matter* (2019-today)

10 SAMPLE PAPERS

Rolling away from the wall into granular matter

Díaz-Melián, V. L. Serrano-Muñoz, A., Espinosa, M, Alonso-LLanes, L., Viera-López, G. and **Altshuler, E.**
Physical Review Letters **125**, 078002 (2020)

E. coli “super-contaminates” narrow ducts fostered by broad run-time distribution

Figuroa-Morales, N, Rivera, A., Soto, R., Lindner, A., **Altshuler, E.** and Clément, E.
Science Advances **6**, eaay0155 (2020)

Settling into dry granular media in different gravities (featured by Science)

Altshuler, E., Torres, H., González-Pita, A., Pérez-Penichet, C., Sánchez-Colina, G., Waitukaitis, S., and Cruz, R.
Geophysical Research Letters **41**, 3032 (2014)

Foraging at the edge of chaos: internal clock versus external forcing (Editor’s Choice)

Nicolis, S. C., Fernández, J., Pérez-Penichet, C., Noda, C., Tejera, F., Ramos, O., Sumpter, D. J. T. and **Altshuler, E.**
Physical Review Letters **110**, 268104 (2013)

Avalanche prediction in a self-organized pile of beads (featured by New Scientist)

Ramos, O. , **E. Altshuler, E.** and K. J. Måløy
Physical Review Letters **102**: 078701 (2009)

Symmetry breaking in escaping ants (featured by Discover)

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)

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)

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 (April 2022)

Review articles in journals indexed in the Web of Science

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)

Entangled Active Matter: from cells to ants

Hu, D., Phonekeo, S., **Altshuler, E** and Brochard-Wyart, J. F.

The European Physical Journal – Special topics **225**, 631 (2016)

Standard research articles in journals indexed in the Web of Science

Intruders cooperatively interact with a wall into granular matter

Espinosa, M., Díaz-Melián, V., Serrano-Muñoz, A., **Altshuler, E.**

Granular Matter **24**, 39 (2022)

Sink versus tilt penetration into shaken dry granular matter: the role of the foundation

Alonso-Llanes, L, Sánchez-Colina, G, Batista-Leyva, A. J., Clément, C., **Altshuler, E**, Toussaint, R.

Physical Review E **105**, 024903 (2022)

Design of a magnetically driven current cloak

A.S. García-Gordillo and **Altshuler, E.**

Journal of Physics D: Applied Physics **54**, 325301 (2021)

Rolling away from the wall into granular matter

Díaz-Melián, V. L. Serrano-Muñoz, A., Espinosa, M, Alonso-Llanes, L., Viera-López, G. and **Altshuler, E.**

Physical Review Letters **125**, 078002 (2020)

In-plane anisotropy in BSCCO superconducting tapes: Transport and magnetometric criteria

García-Gordillo, A. S., Sánchez-Valdés, C. F., Sánchez-Llamazares, J.L. and **Altshuler, E.**

Cryogenics **109**, 103012 (2020)

E. coli “super-contaminates” narrow ducts fostered by broad run-time distribution

Figuroa-Morales, N, Rivera, A., Soto, R., Lindner, A., **Altshuler, E.** and Clément, E

Science Advances **6**, eaay0155 (2020)

An autonomous robot for continuous tracking of millimeter-sized walkers

A. Serrano-Muñoz, A., Frayle-Pérez, S., Reyes, A., Almeida, Y., **Altshuler, E.** and Viera-López, G.

Review of Scientific Instruments (2019)

Temperature dependence of the in-plane and grains resistivities in Bi-2223 polycrystalline superconductors
Cruz-García, A., Fernández-Gamboa J. R., **Altshuler, E.**, Jardim, R. F., and Muné, P.
Journal of Materials Science:Materials in Electronics (JMSE) 30, 14320 (2019)

Electrical effective parameters of the grains and the Montgomery's method in $Bi_{1.65}Pb_{0.35}Sr_2Ca_{2.5}Cu_{3.5}O_y$ ceramics
Cruz-García, A., Fernández-Gamboa J. R., **Altshuler, E.**, Jardim, R. F., Vázquez-Robaina, O. and Muné, P.
Journal of Materials Science:Materials in Electronics (JMSE) 29, 14322 (2018)

Microstructural and electrical transport properties of uniaxially pressed $Bi_{1.65}Pb_{0.35}Sr_2Ca_{2.5}Cu_{3.5}O_{10+d}$ ceramic superconductors
Cruz-García, A., Fernández-Gamboa, J. R., **Altshuler, E.**, Jardim, R. F. Vázquez-Robaina, O., and Muné, P.
Journal of Materials Science: materials for electronics (2018)

A simple way for targeted delivery of an antibiotic: In vitro evaluation of a nanoclay-based composite
Valdés, L., Pérez, I., de Ménorval, L. Ch., **Altshuler, E.**, Fossum, J. O. and Rivera, A.
PlosOne, **12**, e0187879 (2017)

Planetary gravities made simple: Sample test of a Mars rover Wheel
Viera-López, G., Serrano-Muñoz, A., Amigó-Vega, J, Cruzata, O. and **Altshuler, E.**
Review of Scientific Instruments, **88**, 086107 (2017)

Does pelletization pressure modify the effective anisotropy of the grains in (Bi,Pb)2223 bulk system?
García-Cruz, A., **Altshuler, E.**, Fernández-Gamboa, J. R., Jardim, R. F., Vázquez-Robaina, O. and Muné, P.
Journal of Materials Science: materials for electronics (2017) (DOI 10.1007/s10854-017-7138-5)

Exponential velocity profile of granular flows down a confined heap
Martínez, E., González-Lezcano, A., Batista-Leyva, A. J. and **Altshuler, E.**
Physical Review E, **93**, 062906 (2016)

Entangled active matter: from cells to ants.
Hu, D. L., Phonekeo, S., **Altshuler, E.** and Wyart, F. B.
The European Physical Journal – Special topics **225**, 631 (2016)

Uninformed sacrifice: evidence against long-range alarm transmission in foraging ants exposed to localized abduction.
Tejera, F., Reyes, A. and **Altshuler, E.**
The European Physical Journal – Special topics **225**, 665 (2016)

Incorporation of tramadol drug into Li-fluorohectorite clay: A preliminary study of a medical nanofluid
Valdés, L., Hernandez, de Ménorval, L. Ch., Pérez, I., **Altshuler, E.**, Fossum, J. O. and Rivera, A.
The European Physical Journal – Special Topics **225**, 769 (2016)

Smectite as ciprofloxacin delivery system: Intercalation and temperature-controlled release properties
Rivera, A., L. Valdés, J. Jiménez, I. Pérez, A. Lam, **E. Altshuler**, L.C. de Ménorval, J.O. Fossum, E.L. Hansen, Z. Rozynek
Applied Clay Science **124-125**, 150 (2016)

Living on the edge: transfer and traffic of E. coli in a confined flow

Figuroa-Morales, N., G. Miño, A. Rivera, R. Caballero, E. Clément, **E. Altshuler** and A. Lindner
Soft Matter **11**, 6284 (2015)

Classification and dynamics of tropical clouds by their fractal dimension

Batista-Tomás, A. R., Díaz, O. Batista-Leyva, A. J. and Altshuler, E.
Quarterly Journal of the Royal Meteorological Society **142**, 983 (2016)

In-plane transport anisotropy in BSCCO-Ag multi-filamentary tapes

Borroto, A., A. S. García-Gordillo, M. Arronte, L. Del Río and **E. Altshuler**
Superconductor Science and Technology **28**, 075008 (2015)

Modeling transport properties of inhomogeneous superconductor-metal composites

Borroto, A., L. Del Río, M. Arronte, T. H. Johansen and **E. Altshuler**
Applied Physics Letters. **105**, 202604 (2014)

“Lock-in” accelerometry to follow sink dynamics in shaken granular matter

Sánchez-Colina, G., L. Alonso-Llanes, E. Martínez, A. J. Batista-Leyva, C. Clement, C. Fliedner, R. Toussaint and **E. Altshuler**
Reviews of Scientific Instruments **85**, 126101 (2014)

Settling into dry granular media in different gravities

Altshuler, E., H. Torres, A. González-Pita, G. Sánchez-Colina, C. Pérez-Penichet, S. Waitukaitis and R. C. Hidalgo
Geophysical Research Letters **41**, 3032 (2014)

Vibrot, a Simple Device for the Conversion of Vibration into Rotation Mediated by Friction:

Preliminary Evaluation

Altshuler, E., M. Pastor, A. Garcimartín, I. Zuriguel and D. Maza
PlosOne **8**, e67838 (2013)

Foraging at the Edge of Chaos: Internal Clock versus External Forcing

Nicolis, S., J. Fernández, C. Pérez-Penichet, C. Noda, F. Tejera, O. Ramos, D. J. T. Sumpter, **E. Altshuler**
Physical Review Letters **110**, 268104 (2013)

Local transport in multi-filamentary superconductors: longitudinal vs. transverse dissipation

Borroto, A., L. Del Río, **E. Altshuler**, M. Arronte, P. Mikheenko, A. Qviller and T. H. Johansen
Superconductor Science and Technology **26**, 115004 (2013)

Upstream contamination by floating particles

Bianchini, S., A. Lage, T. Siu, T. Shinbrot and **E. Altshuler**
Proceedings of the Royal Society A **469**, 20130067 (2013)

Controlled densification and anomalous dispersion of E. Coli through a microfluidic funnel

Altshuler, E., G. Miño, L. del Río, C. Pérez-Penichet, A. Lindner, A. Rousselet and E. Clément
Soft Matter **9**, 1864 (2012)

Infinite penetration of a projectile into a granular medium

Pacheco-Vázquez, F., G. A. Caballero-Robledo, J. M. Solano-Altamirano,
E. Altshuler, A. J. Batista-Leyva, and J. C. Ruiz-Suárez
Physical Review Letters **106**, 218001 (2011)

“Two-stage dissipation in a superconducting microbridge: experiment and modeling”

del Río, L., **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

Altshuler, E., 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

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

High resolution thermal imaging of hotspots in superconducting films

Haugen, O., 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

Sánchez Valdés, C. F., 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)

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
Batista-Leyva, A. J., M.T.D. Orlando and E. **Altshuler**
Physica C **408-410**: 585 (2004)

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)

Hysteresis and relaxation in HBCO, BSCCO, TBCCO and YBCO superconducting polycrystals
Batista-Leyva, A. J., M. T. D. Orlando and **E. Altshuler**
Physica C, **408-410**: 585 (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 $TiBa_2Ca_2Cu_3O_y$ 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) .

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).

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 $J_c(B_a)$ 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 $J_c(H_a)$ 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)

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).

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).