

Science Outreach.

The press is communicating some of our results (as well as their importance and significance) to the general public. This is a role that the American Physical Society, American Institute for Physics, American Association for the Advancement of Science, the National Science Foundation, etc. are strongly urging scientists to fill.

Outreach efforts to the general public have been repeatedly described by policymakers as crucial to the survival of support for science.

Recent work (about ten year's period: circa 1992—2003) by our group has been featured in:

- *Science News* **142**, 231 (Oct. 92)
- *Science News* **144**, 261 (Oct. 93)
- *Physics World* **6**, 42 (Dec. 93)
- *Science* **264**, 200 (April 94)
- *New Scientist*, p. 36 (12 March 1994)
- *Science News* **147**, 198 (April 95)
- *American Physical Society News* **4**, 8 (June 95)
- *American Institute of Physics: Physics News* **261** (March 6, 96)
- *Science* **271**, 1373 (March 8, 96)
- *American Physical Society News* **5**, 9 (June 96)
- *Physics Today* (“Search and Discovery” section) **50**, No. 6, 19 (June 97)
- *Science News* **152**, No. 3, 37 (July 97)
- *Science On-Line: ScienceNow* (July 17, 1997)
- *American Institute of Physics: Physics News* **331** (July 24, 97)
- *Scientific American* (August, 1997)
- 1998: translations into Japanese, Chinese, Spanish, German, French, Polish, Arabic, etc. of our *Scientific American* article.
- *American Institute of Physics: Science Report Radio* (Physics News broadcasted by Radio Stations) (1998). (Note: For over 25 years, Science Report Radio has been played regularly on 181 stations nationwide. It is the nation's longest running radio science feature. Each program reaches approximately four million listeners. At least one radio station in 19 of the top 20 markets broadcasts the show. In 1997, Science Report also became available via the Public Radio Satellite System).
- *American Physical Society: Division of Materials Physics' Webpage* (1996–present).
- *New Scientist*, No. 2140, p. 16 (June 27, 1998).

- *Science News*, No. 155 (October 31, 1998). Coverstory, and the only featured long article of the issue.
- *New Scientist*, Vol. 161, No. 2179, P. 40 (27 March 1999). Also listed in the cover.
- *Physics World*, **12**, No. 4, p. 24 (April 1999); coverstory.
- 1999 *American Physical Society*: Centennial Exhibit celebrating the 100 years of the APS. Very large posters and also videos on our theory work on vortex dynamics were featured right next to the “history of superconductivity” exhibit. Only another group, Argonne National Laboratory, was featured (experiments on vortex dynamics).
- Featured in the book *How Nature Works*, by Per Bak (Springer-Verlag, 1996). A full page with color photos and text, plus additional mentions elsewhere in the book.
- Newspapers in the US (e.g., *Dallas Morning News*, Oct. 20, 1997, Discovery Section, Cover Story); also in newspapers in Michigan and Colorado.
- Newspapers abroad (e.g., Swiss *Die Weltwoche*, Oct. 2 1997, Science Section, Full page article; and also in Germany).
- Science Magazines abroad. For instance, the December 1997 issue of the European science magazine *Focus* (with a circulation of over 300,000 copies per issue) devoted five pages (p. 32-36), including an interview, and also in the cover; the weekly *Panorama* (page 165; May 14, 1994) also featured our work.
- German Television Program on Science *Programmbereich Kultur und Wissenschaft*, MDR, Leipzig, Nov. 10, 1997.
- 1998: Featured in the book *Impossibility: The Limits of Science and the Science of Limits*, (Oxford University Press, Oxford, 1998).
- 1998: Several of our results are very prominently featured and described in some detail in Chapter 2 of the book: *Self-organized Criticality: Emergent Complex Behavior in Physical and Biological Systems*, by H. Jensen (Cambridge, 1998). This book is used in several specialized graduate courses and is considered one of the best introductions to the area of emergent complex behavior in physical systems, viewing self-organization as a critical phenomenon (i.e., applying ideas of critical phenomena to jammed systems like granular assemblies, vortices in superconductors, dislocations in materials, charge density waves, fault dynamics, etc.).
- 1999: Michigan Daily (2-12-1999). Ann Arbor News (2000). Both on sand avalanches.
- 1999: 10-minutes Television program broadcasted by The Learning Channel (part of the Discovery Channel Network). It was first broadcasted on February 15, 16, and 17 of 1999, and replayed many times later. The Discovery Channel is broadcasted in 18 languages over eight networks by 13 satellites worldwide, reaching over 39 million homes internationally in 144 countries and 71 million households in the United States.
- 2000: The Discovery Channel: Television program first broadcasted in the summer of 2000, and rebroadcasted many times since then. In early October of 1999, the TV filming crew (from Europe) and myself spent several days in Sand Mountain, Nevada. There, I explained the mechanism of acoustic emissions of sand avalanches. In the previous TV program, in 1999, a different TV director flew from Los Angeles and filmed here on campus, filming some lab demonstrations and an interview. I helped with the initial versions of the script and as an advisor to both programs. The 1999 program was centered in our research. The 2000 program was more general and briefly mentioned it (in this one our input was mostly as an advisor to the program, and as an on-site guide in Nevada while measurements were taken with a group from the University of Nevada).

- 2002: Our publication on novel quantum nano-circuitry: “Scalable Quantum Computing with Josephson junction Qubits”, J.Q. You, J.S. Tsai, and F. Nori, in *Physical Review Letters*, **89**, 179 (November 2002) (available on line from <http://link.aps.org/abstract/PRL/v89/e197902>) has been featured in several places, including:

- The December 11 to 18, 2002, issue of the *Technology Review News*, Page 1. Available at <http://www.trnmag.com/>. It features our results, and also four other stories for that week. The article, titled “Design links quantum bits”, is relatively long (for a news piece).
- November 22, 2002: United Business Media’s *Electrical Engineering Times*, described as “The Industry Source for Engineers and Technical Managers Worldwide”, has an article describing our results (titled: “Superconducting junctions eyed for quantum computing” and available at <http://www.eetimes.com/story/OEG20021122S0013>).
- *Electronics Weekly*, November 06, 2002, News; Pg. 5, on our results on “Quantum qubits”.
- October 23, 2002. “Paper Discusses Circuitry for Quantum Computing”, in *Supercomputing online*. Available at <http://www.supercomputingonline.com/article.php?sid=2756>
- Our work motivated the long article “Thoughtful about uploading”, Bill Tammeus, Kansas City Star, November 2, 2002.
- October 2002: Featured in *Innovations Report, Forum für Wissenschaft, Industrie und Wirtschaft*, a technical news site in Germany.
- October 23, 2002, featured in *AScribe - The Public Interest Newswire*. October 24, 2002, featured in *NewsWise*, that covers new science and technology developments.
- The December 2002 issue of *Science and Technology Trends* (number 21, Dec. 2002) has a one-page article featuring our November 2002 PRL results. This is a publication of the “Science and Technology Foresight Center” of the National Institute of Science and Technology Policy (NISTEP). The latter is part of the Ministry of Education, Culture, Science and Technology. Japan. It is available on-line in English at <http://www-personal.engin.umich.edu/~nori/scalable/>

Newspaper articles overseas include the following ones:

- *Japan Industry News* of the “Japan Industrial Journal”, page 2, Thursday, October 24, 2002.
- *Daily Industrial Newspaper* (the Nikkan Kogyo Shinbun), page 4, Thursday, October 24, 2002.
- *Nikkei* (this important newspaper is the Japanese version of the “Wall Street Journal”), Friday, October 25, 2002.
- *Science News* (in Japan), November 8, 2002.

- 2002: Our publication “Experimentally-realizable devices for controlling the motion of magnetic flux quanta in anisotropic superconductors”, S. Savelev and F. Nori, published in *Nature Materials*, **1**, 179 (November 2002), has been:

- Listed on the cover of the November issue of *Nature Materials*.
- also featured in a pedagogical two-pages “News and Views”, *Nature Materials* **1**, 143 (2002), titled: “Controlling the Motion of Quanta”.
- *Nikkei* (this newspaper is the Japanese version of the “Wall Street Journal”), Monday, January 6, 2003. An article on Page 23 describing these results.
- November 6, 2002. “Stories of modern science, from UPI”, By Ellen Beck. (UPI = United Press International).
- November 13, 2002. *Electronics Weekly*, Pg. 6. “US and Japanese scientists control magnetic flux quanta”.
- The UM press release in <http://www.umich.edu/%7Enewsinfo/Releases/2002/Nov02/r110402c.html> was covered by news agencies and newswire services, including: (*) *Innovations Report, Forum für Wissenschaft, Industrie und Wirtschaft*, a technical news site in Germany); (*) *AScribe*, The Public Interest Newswire; (*) *NewsWise*, that covers new science and technology developments.

- 2002: Our 1999 work on “Biologically-inspired solid-state devices for the control of the motion of quanta” is nicely highlighted in the *Molecular Motors* first feature article of the November, 2002, Physics Today, page 38.

- 2003: Our work OBSERVING BROWNIAN MOTION IN VIBRO-FLUIDIZED GRANULAR MATTER, by G. D’Anna, et al. *Nature*, **424**, 909-912 (August 21, 2003), available on-line at <http://www.nature.com/nature/links/030821/030821-1.html> has been featured in (the list below is very incomplete):
 - *Cover Story of Nature* (August 21st 2003 issue of Nature). The text accompanying the cover photo was: “Against the Grain. Brownian motion in a non-equilibrium system”.
 - A companion “News and Views” in that issue of Nature.
 - *it Science Letter*, September 15, 2003. <http://www.NewsRX.net>.
 - TV programs. Three examples (of about five minutes each) were broadcasted in Europe (one on the German “Fokus” (by MFW: Menschen Technik Wissenschaft), a different program in Italian, and a quite different one in French). Also in radio programs (e.g., Radio Swiss International).
 - Featured (in all languages of the European Union) in the High-Tech News of “Euronews”.
 - Long Newspaper articles include *Il Secolo XIX*, Agosto 27, 2003, page 31, (in Italian) in the section on “Research and Science”. Also, *Sole 24 Ore*, Settembre 11, 2003, the most important Italian newspaper on finances and the economy.
 - Featured in the long article: “Nel Mondo dei Granelli di Sabbia”, *Scienza e Conoscenza*, 9-12-2003.
 - News coverage in French include: *L’Hebdo*, *Le Temps*, *24 Heures*.
 - News coverage in German include: *Tages-Anzeiger*, *Neue Zürcher Zeitung*, *St. Galler Tagblatt Gesamtausgabe*, *Basler Zeitung*.
 - Interviewed by Nikkei, the most important Japanese newspaper on finances and the economy.
 - the University of Michigan press release in
<http://www.umich.edu/news/index.html?Releases/2003/Aug03/r082003>
<http://ipumich.temppublish.com/cgi-bin/print.cgi?Releases/2003/Aug03/r082003>
 was covered by news agencies and newswire services, including:
 - * *The Resource for Science Information* (BrightSurf.com). One of the few “Today’s Science News” for August, 25, 2003.
 - * *Innovations Report* (Forum fur Wissenschaft, Industrie und Wirtschaft, Germany). August, 25, 2003.
 - * *Global Technology Market Place* (GlobalTechnoScan.com). Weekly Magazine on New Technology. Issue 27th Aug to 2nd Sept. 2003.
 - * *EurekAlert! Public News*. A Service of the American Association for the Advancement of Science, with support from the US Department of Energy and the US National Institutes of Health. Eurekaalert.org is described as the premier web site for science news since 1996. Public release date: 22-Aug-2003.
 - * *Science News*. 8/22/2003. <http://sciguy.com/News/Article.asp?ArticleID=5410>
 - * *Headline News*. NewsHub.com. 22-Aug-2003.
 - * *Knowledge Science*. <http://www.kenkyu40.net/index.php>
 - * World Wide News Headliner.

- 2003: Our work on vortex dynamics in superconductors will be featured in part of a television program, prepared by the Danish Broadcast Corporation, about the study of superconducting materials.

- 2003: Our recent publication “Controlling Transport in Mixtures of Interacting Particles using Brownian Motors”, by S. Savel’ev, F. Marchesoni, and F. Nori, *Phys. Rev. Lett.* **91**, 10601 (2003), available on-line at <http://link.aps.org/abstract/PRL/v91/e010601>, has been featured:
 - for several weeks as the top-listed research news in the front page of the University of Michigan web site (www.umich.edu). This web site gets a lot of traffic everyday. The actual press release is in <http://www.umich.edu/news/Releases/2003/Jun03/r061903.html>.
A very nontechnical and brief graphical summary is in <http://www.umich.edu/news/Releases/2003/May03/img/ratchets.jpg>
 - Newswise/Science News also appeared in Small Times magazine (presenting technological advances in nano-science). <http://www.smalltimes.com>
 - *Le Scienze*, the Italian version of Scientific American, among other science news outlets.
 - “Conveyor Belt on a nanometer scale”, *Machine Design*, No. 19. Vol. 75, Pg. 35; October 9, 2003.

- 2003: Our recent publication “Reversible Rectifier that Controls the Motion of Magnetic Flux Quanta in Superconductors”, by J.E. Villegas, S. Savel’ev, F. Nori, E.M. Gonzalez, J.V. Anguita, R. Garcia, and J.L. Vicent, *Science* **302** 1188 (2003) has been featured in several venues including:
 - an “Enhanced Perspectives” in *Science* **302** 1159 (2003). It is available on-line at <http://www.sciencemag.org/cgi/content/full/302/5648/1159>. This is the only “Enhanced Perspectives” of that issue of *Science*, with dozens of links with further information on the subject, and one of three “Enhanced Perspectives” covering all of physics for 2003.
 - prominently featured in the page “This week in Science” of that issue of *Science* (Nov. 14, 2003).
 - High-Tc Update (November 2003).
 - Newspapers in Europe (e.g., El Pais, Madrid), Japan, and the USA.