

REVOLUTIONARY DISCOVERIES
IN
PHYSICS & COSMOLOGY

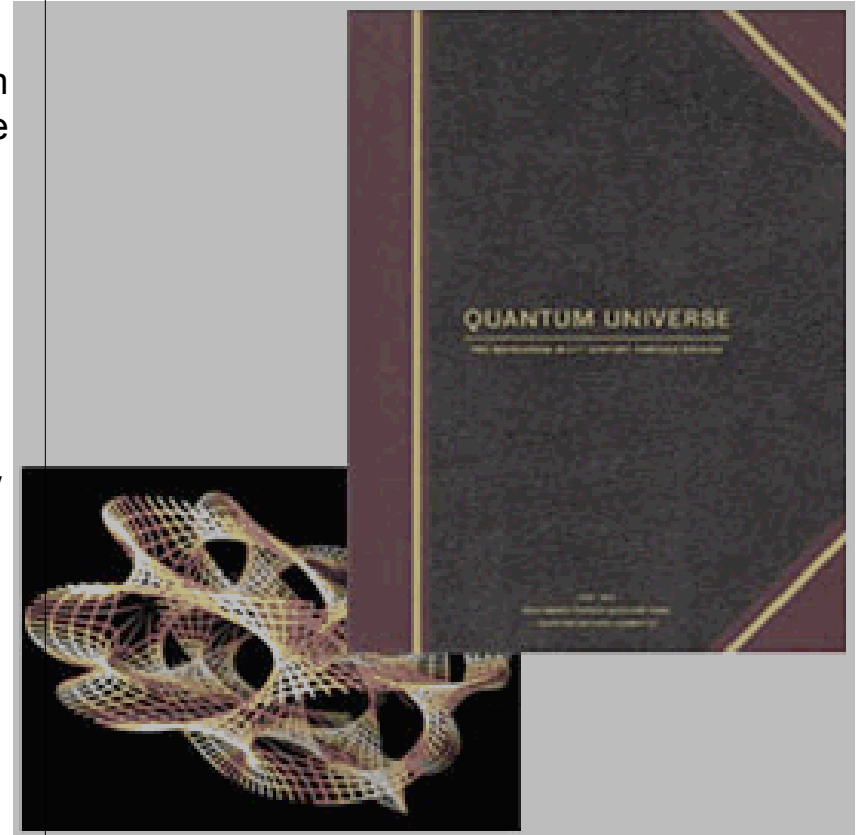
The Quantum Universe Report

<http://www.interactions.org/cms/?pid=1012346>

To discover what the universe is made of and how it works is the challenge of particle physics. Quantum Universe presents the quest to explain the universe in terms of quantum physics, which governs the behavior of the microscopic, subatomic world. It describes a revolution in particle physics and a quantum leap in our understanding of the mystery and beauty of the universe.

Nine interrelated questions define the path ahead.

1. Are there undiscovered principles of nature: new symmetries, new physical laws?
2. How can we solve the mystery of dark energy?
3. Are there extra dimensions of space?
4. Do all forces become one?
5. Why are there so many kinds of particles?
6. What is dark matter? How can we make it in the laboratory?
7. What are neutrinos telling us?
8. How did the universe come to be?
9. What happened to the antimatter?



Multi-Dimensional Spacetime

T.O.E. - Fermilab Modeled after Cathedral to Represent Science, Philosophy & Theology asking Same Questions

<http://www.fnal.gov/pub/today/pdfs/2007/20070807.pdf>

<http://www.fnal.gov/pub/today/pdfs/2007/20070823.pdf>

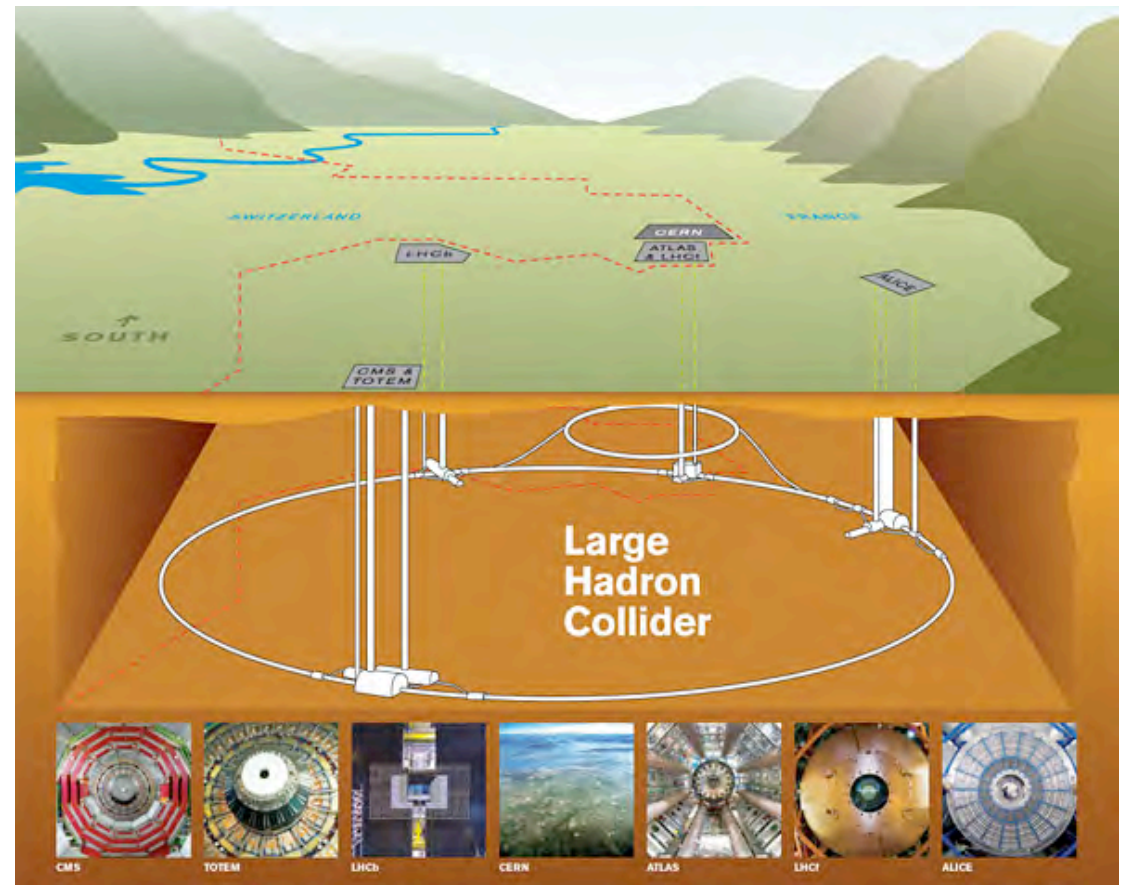
http://www.fnal.gov/pub/today/archive_2008/today08-04-03.pdf



Symmetry Journal December Issue

ALICE Time Projection Chamber

<http://www.symmetrymagazine.org/cms/?pid=1000562>

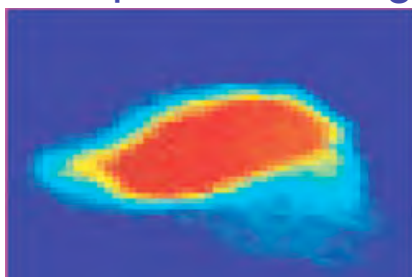
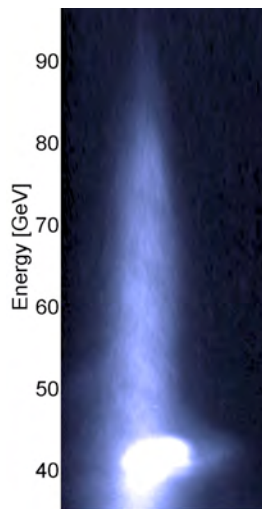


Fermilab Pajama Party at LHC Start-Up

<http://www.fnal.gov/pub/today/pdfs/2006/20060927.pdf>

<http://www.fnal.gov/pub/today/pdfs/2007/20070308.pdf>

http://www.fnal.gov/pub/today/archive_2008/today08-09-10.pdf



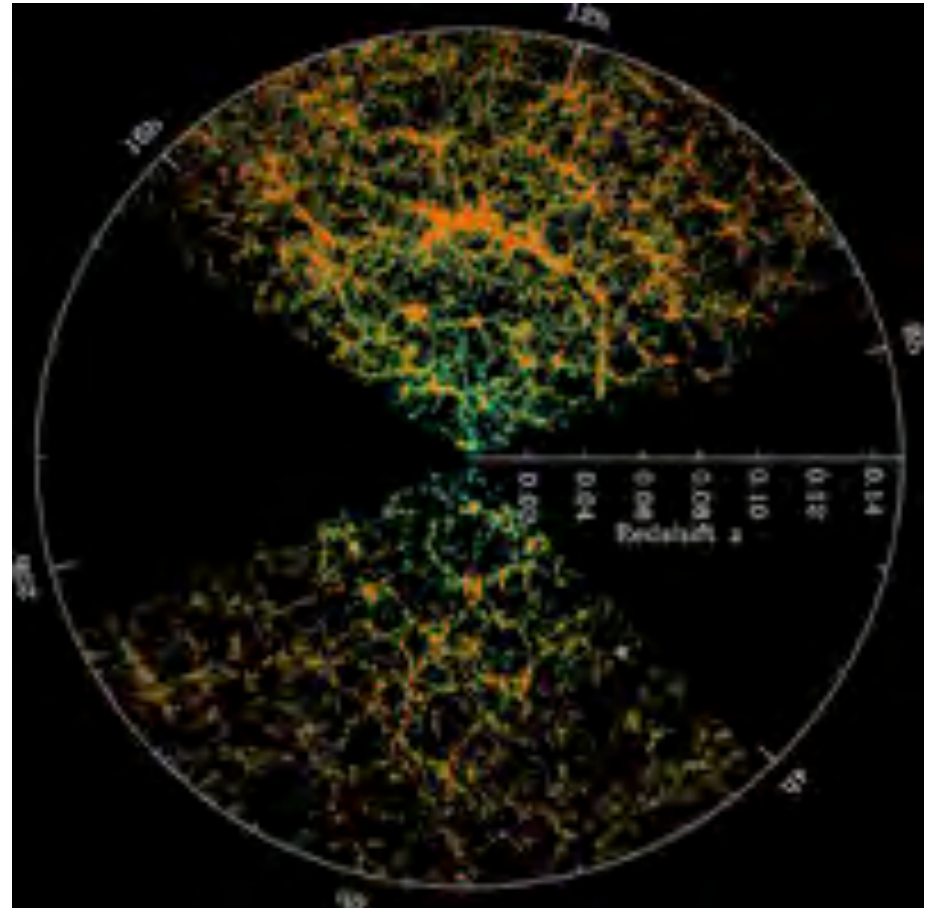
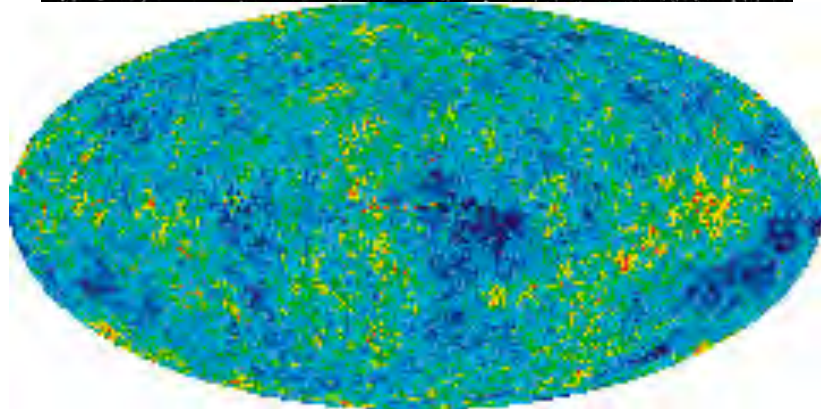
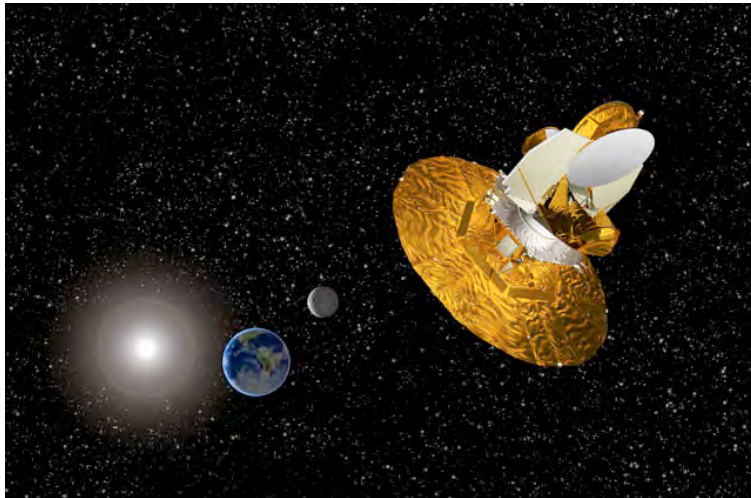
3D & CMB Reveal a Surprising Universe

<http://www.fnal.gov/pub/today/today03-12-22.html>

<http://www.fnal.gov/pub/today/pdfs/2005/20051128.pdf>

<http://www.fnal.gov/pub/today/pdfs/2007/20070517.pdf>

http://www.fnal.gov/pub/today/archive_2008/today08-08-19.pdf



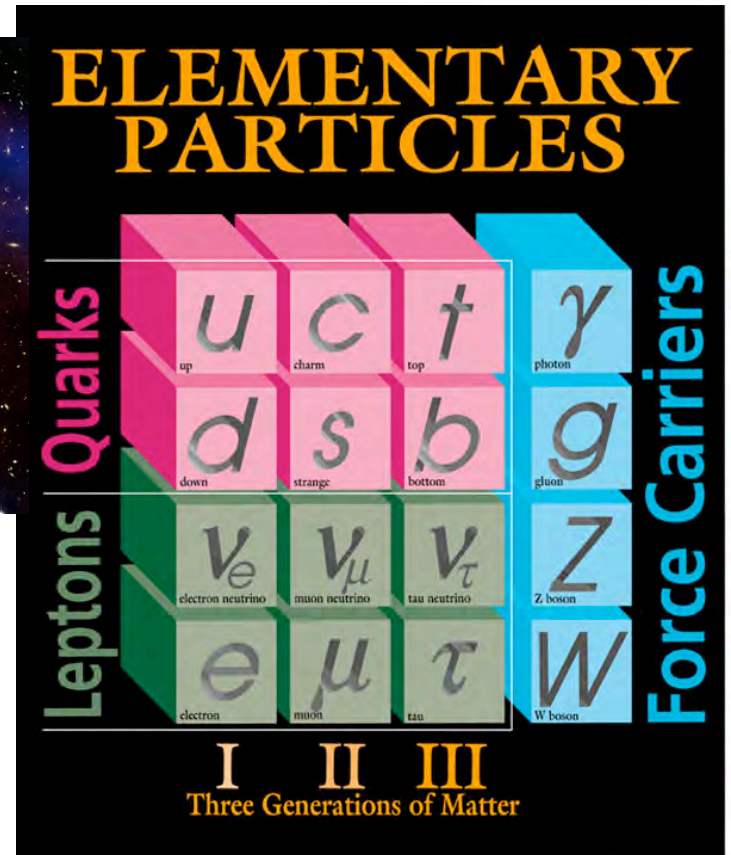
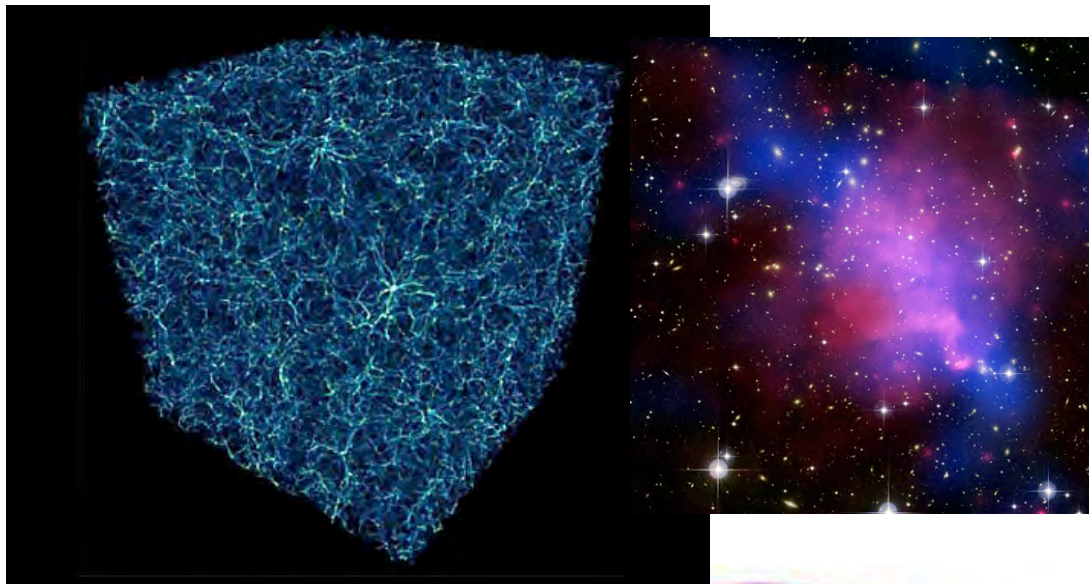
Possibly 95% of the Universe made of a Mysterious form Of Matter & Energy

<http://www.fnal.gov/pub/today/pdfs/2007/20070913.pdf>

http://www.fnal.gov/pub/today/archive_2008/today08-05-20.pdf

http://www.fnal.gov/pub/today/archive_2008/today08-05-27.pdf

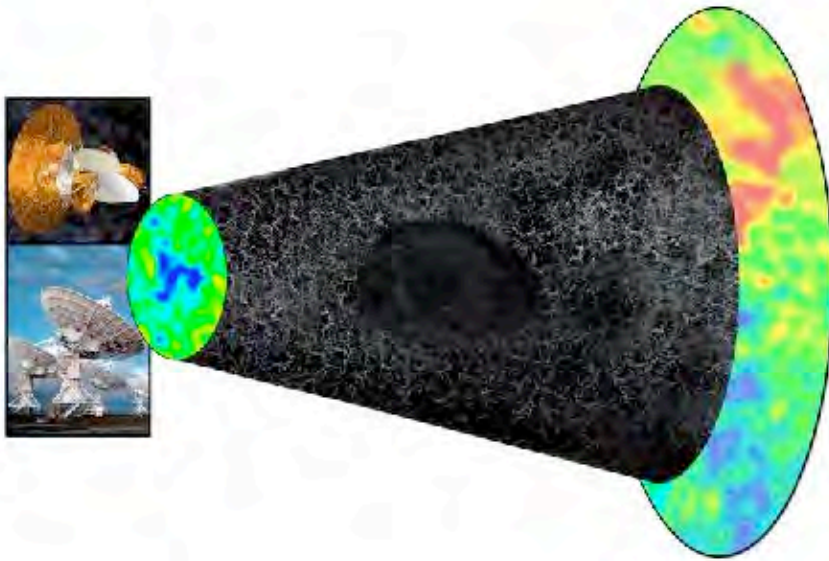
http://www.fnal.gov/pub/today/archive_2008/today08-08-29.pdf



Galaxies pulled by something very large outside of the visible Universe & Mysterious Hole in the Universe

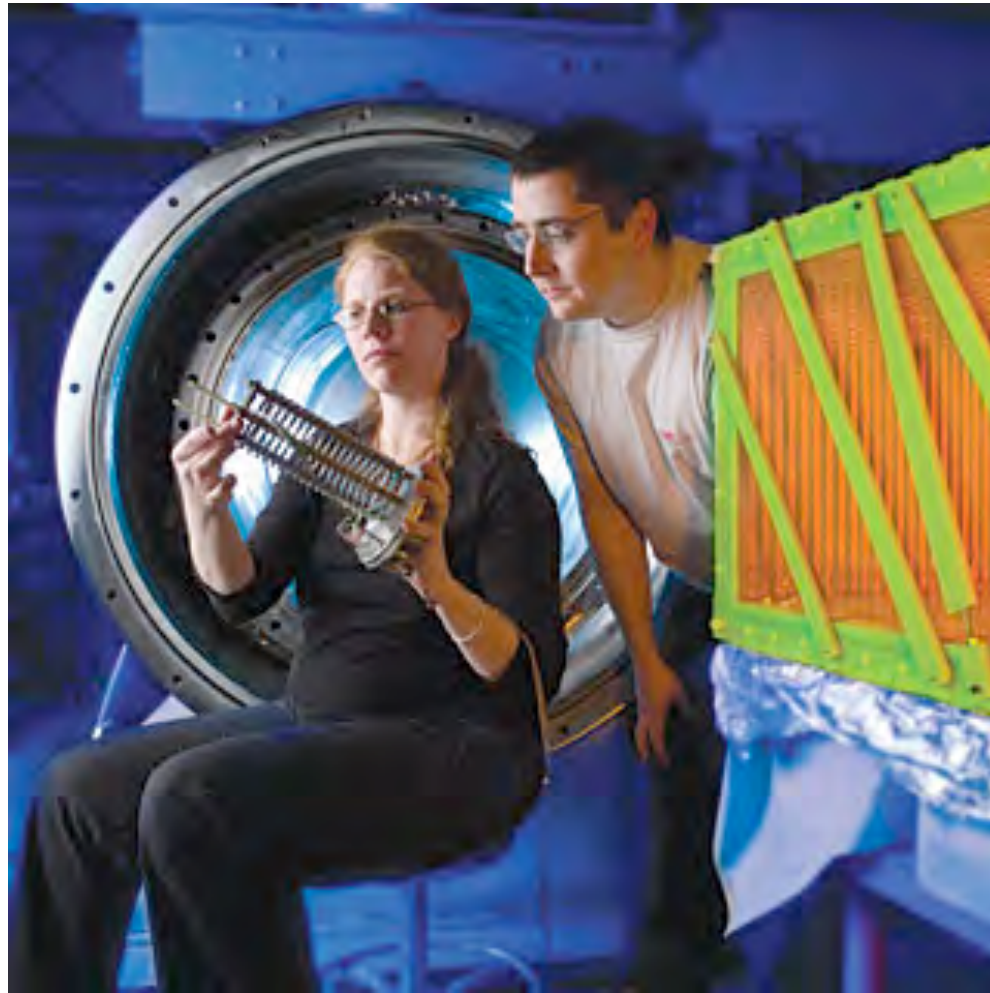
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http://www.fnal.gov/pub/today/archive_2008/today08-09-26.pdf



Fermilab Looks for Visitors from Another Dimension

http://www.fnal.gov/pub/today/archive_2008/today08-09-18.pdf

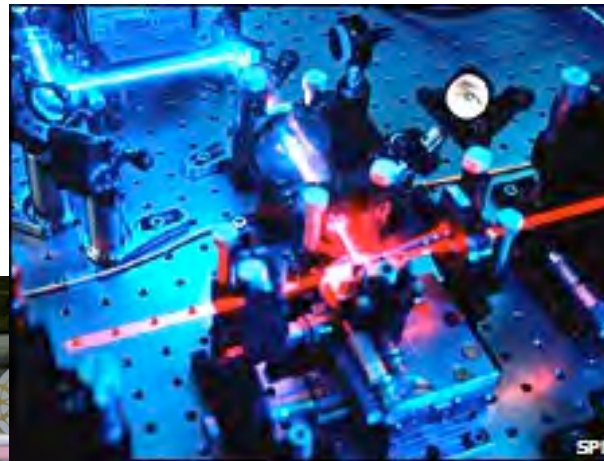


Grid/Cloud & Quantum Cryptography

http://www.fnal.gov/pub/today/archive_2008/today08-04-09.pdf

http://www.fnal.gov/pub/today/archive_2008/today08-09-05.pdf

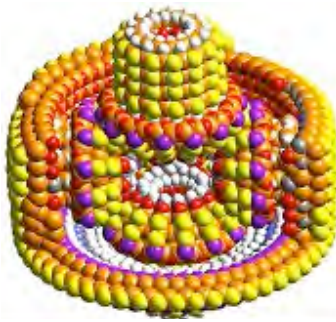
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Nature's Nanomachines –U of C Berkeley

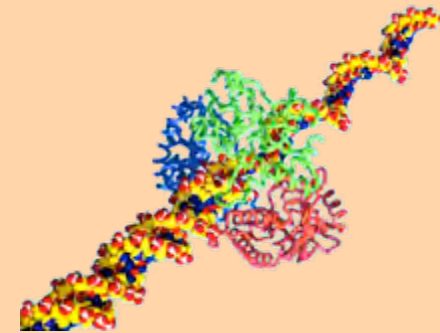
http://www-ppd.fnal.gov/EPPOffice-w/colloq/colloq_04_05.html

Biological motion is produced by molecular motors



Imaginary Nanomotor

- **Myosin:** muscle contraction, cargo transport
 - **Kinesin:** cargo transport, chromosome separation
 - **Dynein:** cargo transport, sperm swimming
 - **Lambda exonuclease:** chews up a strand of DNA
 - **RNA polymerase:** copies DNA into RNA
 - **ATP synthase:** a rotary turbine that generates ATP
- and many others . . .



Real Nanomotors

