Vassar College Application for LSC Membership

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Vassar College

- "highly selective" Liberal Arts college (undergrad only)
- founded in 1861 as a college for women, but co-ed since 1969 (spread the word!)
- 2400 students, 220 faculty
- 80% of students go on to advanced study within 5 years (medicine, law, business, grad school)

Physics and Astronomy

- 2 Astronomers, 4 Physicists, 2 Lecturers
- 10-15 majors per year (about 2/3 choose to go on to grad school)
- Teaching load 5 classes/year
- Program in Science, Technology and Society
- Dartmouth Thayer School of Engineering 3-2 program:
  A.B. from Vassar and B.E. from Dartmouth

Astronomy at Vassar

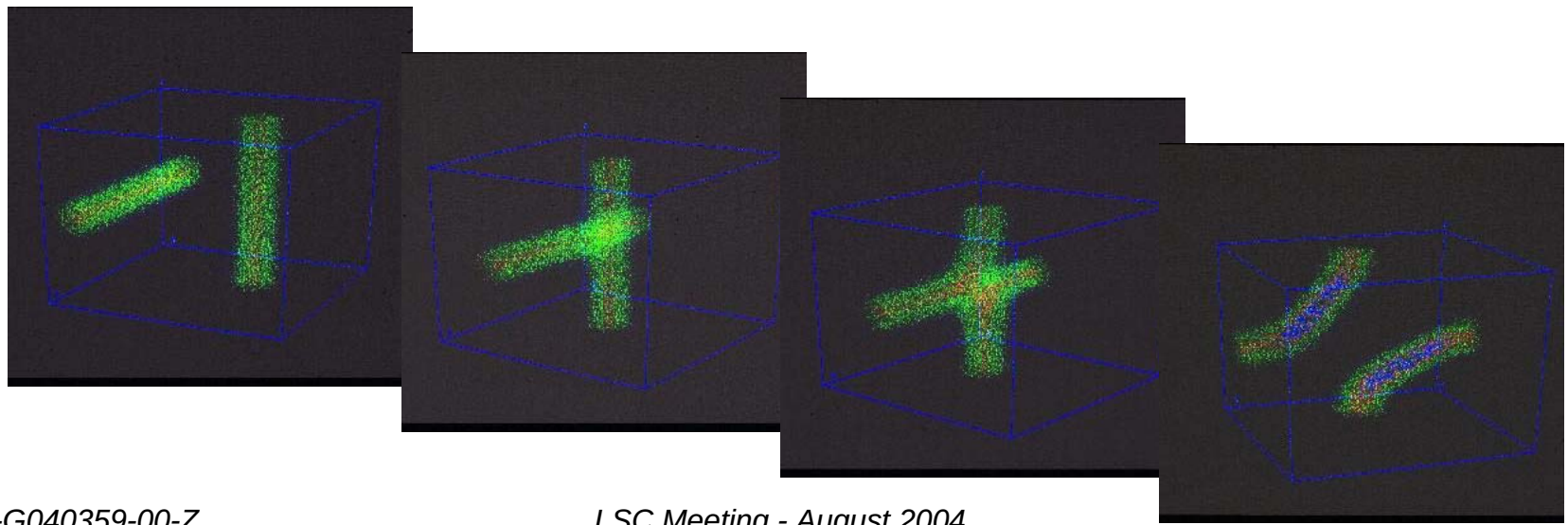
- Maria Mitchell was the first astronomy professor at Vassar
- New "*Class of '51 Observatory*" with 32" and 20" telescopes
- Keck Consortium – summer research for undergraduates

Physics at Vassar

- Morton Tavel – Theoretical Physics
  - "*Contemporary Physics and the Limits of Knowledge*"
- Jamie Lombardi – Astrophysics
  - Simulation of stellar collisions & cluster dynamics
  - Member of MODEST collaboration
- Cindy Schwarz – Particle Physics -> Physics Education
  - "*A Tour of the Subatomic Zoo*"
  - "*Tales from the Subatomic Zoo*"
  - "*Interactive Physics Player Workbook*"
  - President-elect of AAPT NY chapter
- Eric Myers – Particle Physics / Gravitational Physics

Eric Myers - background

- Calculated Casimir energy of graviton (one-loop effective potential) for $M_4 x S_N$ Kaluza-Klein theory
- Lattice Gauge Theory – QCD on CM-2, calculation of speed of sound in quark-gluon plasma (Cyber 205)…
- Hamiltonian simulation of colliding cosmic strings shows that they "intercommute" (w/ Claudio Rebbi, Boston U.)



Eric Myers – cont.

- Lattice model of SO(3,1) non-linear sigma model has free field theory as continuum limit (it's "trivial")
  (w/ Bryce DeWitt and Joe Polchinski, UT Austin)

- Univ. Michigan/DØ at FNAL: implemented calibration database for Central and Forward Preshower detectors, and calibration manager
- Univ. Michigan/ATLAS at CERN: Grid computing, including construction of USATLAS Grid testbed site.
- Univ. Michigan/WLAP: Web Lecture Archive Project to record slide-based physics and technical lectures (used for ATLAS SW training, FNAL colloquium, CERN and UM)

Resources

- Myers + students
- Undergraduate Research Summer Institute (URSI)
- Newly renovated lab space / 8 node Beowulf
- Student computing room / SciVis laboratory
- Department fileserver for 700GB RAID (Fall 2004)

- Vassar Networking improvements (Myers on CCET):
  - Physics building wired for cat6 (gigabit) in Summer 2003
  - Campus network partitioned in January 2004
  - Campus gateway upgraded from 12Mbs to 20Mbs (and new service provider) in July 2004
  - New VP for Computing in July 2004

Scientific Goals

- Detection and study of GW sources, or an upper bound on source objects, regardless of possible EM counterparts.

  This requires…
- Data analysis for a wide range of source parameters, including sky position, orientation, and source type

  > I propose to work with Pulsar search group

  This requires…
- Large scale distributed computing for GW data analysis:
  - Grid computing, and
  - Distributed Public Computing (a'la SETI@Home)

  > I propose to work on design, construction, testing and operation of Einstein@Home

Summer 2004- Pirates@Home

- Worked with VC URSI student Kimberly Lefkowitz '04 to "test drive" the Berkeley Open Infrastructure for Network Computing (BOINC!), the core of the next generation of SETI@Home
- Set up complete BOINC project (http://pirates.vassar.edu) which includes:
  - Database server
  - Project web site, w/ user accounts (over 650 users, 20 teams)
  - Scheduling server, file download/upload, "trivial" validation, credit!
  - BOINC applications that run under Linux, Windows, MacOS X using the BOINC API
  - BOINC graphics API and OpenGL (GLUT or not?)
  - **Working Windows screensaver!**
- Proposed MOU is continuation of this work for Einstein@Home

Near-term goals (MOU)

- Participate in development, testing, maintenance, support and improvement of a high-quality screensaver for the Windows platform for Einstein@Home (Linux and Mac to follow).
- Development of code to "*validate*" and "*assimilate*" results returned to BOINC server by clients.
- Development of back-end tools to carry out automated follow-up studies for searches performed by clients.
- Assist in deployment and operation of servers.
- Alternate screensavers to attract wider audience?

Pipelines

1. Beam pipes for LIGO IFO
2. Data analysis pipelines
3. Physicists training pipleine: