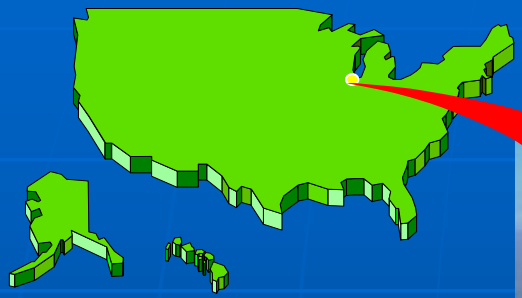
HEPGrid and e-Learning Initiatives in Brazil

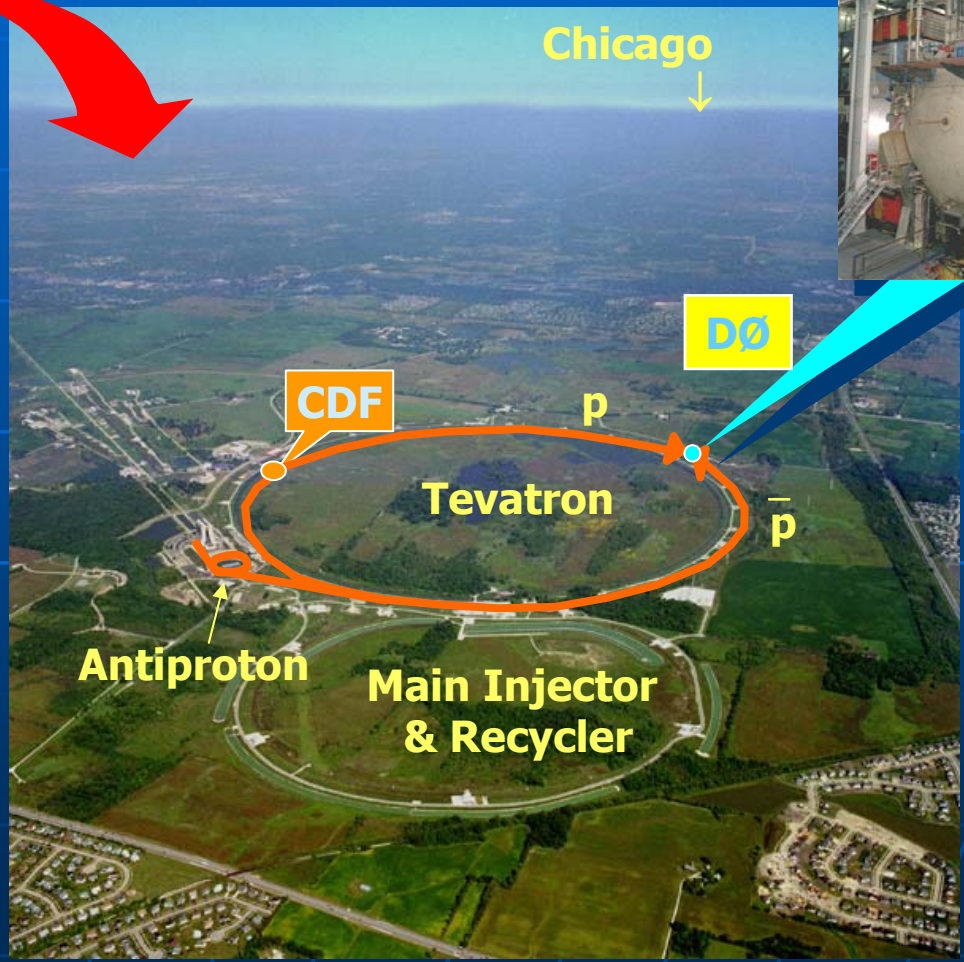
S. F. Novaes
IFT/UNESP

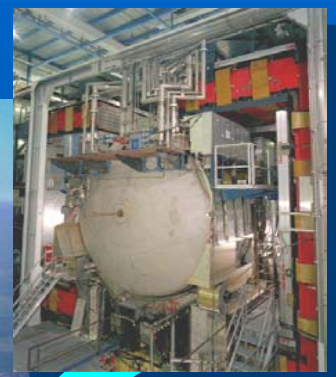
HEPGrid and e-Learning

- HEP Data Avalanche and Grid
- Brazilian Grid Initiatives
  - HEPGrid/Brazil and SPRACE
- Implementation of Grid Infrastructure
  - GridUNESP
- e-Learning and TIDIA Project
  - CEPA Associate Laboratory

Tevatron at Fermilab

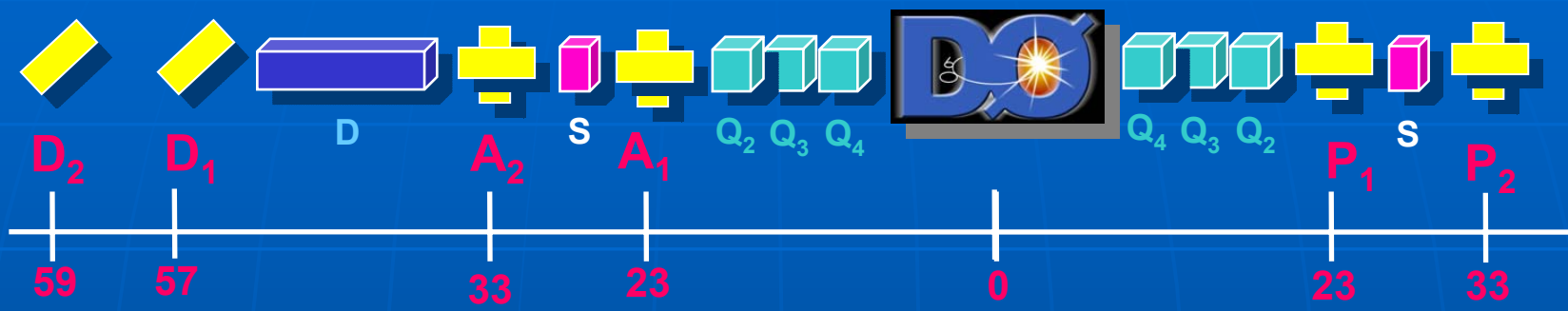


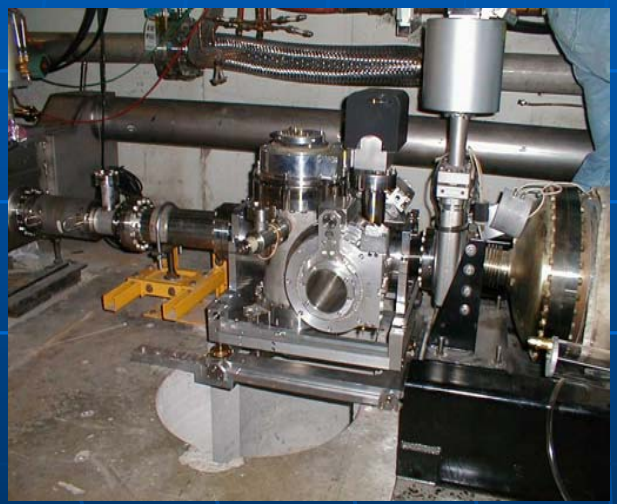


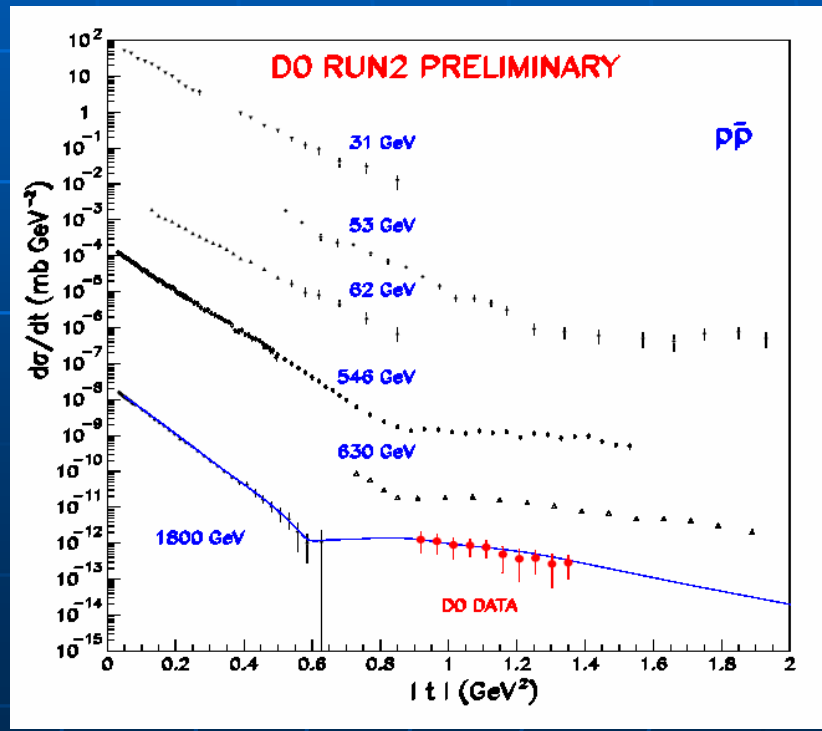


- World's highest energy
  - E = 1.96 TeV
  - Luminosity = 0.5 fb^{-1}
- Two interaction points:
  - CDF
  - DØ

Forward Proton Detector







A Brazilian Enterprise!

- Elastic p-pbar cross section
- Several analyses underway

CERN: An Avalanche of Data

LHC

- 10 PB/year

- Transmission of data "on demand" (~ 1 TB)
  - 2 hours @ 50% of 2.5 Gbps
  - Goal: South America at 10 Gbps by 2009

Brazilian Consortium at DØ and CMS

- **Experimental Physicists:**

- Alberto Santoro (UERJ)
- Marcia Begalli (UERJ)
- Wagner de Paula Carvalho (UERJ)
- José Guilherme R. de Lima (UERJ)
- José Roberto P. Mahon (UERJ)
- Carley P.O. Martins (UERJ)
- Luiz M. Mundim (UERJ)
- Vitor Oguri(UERJ)
- Wanda L. Prado (UERJ)
- Andre Sznajder (UERJ)
- Gilvan Augusto Alves (CBPF)
- Helio da Motta (CBPF)
- Maria Elena Pol (CBPF)
- Moacyr Souza (CBPF)
- Jorge Barreto (UFRJ)
- Sérgio F. Novaes (IFT-UNESP)
- Eduardo Gregores (IFT-UNESP)
- Newton Oliveira (UFBA)

- **Phenomenologists**

- Oscar J. P. Eboli (USP)
- Renata Z. Funchal (USP)
- Maria Beatriz Ducatti (UFRGS)

- **Enginners / IT**

- Mario Vaz (UFRJ/CBPF)
- Antonio C. Mesquita (UFRJ)
- Claudio Geyer (UFRGS)
- Alexandre Sztajnberg (UERJ)

- **New members**

- Sérgio M. Lietti (IFT-UNESP)
- Pedro G. Mercadante (IFT-UNESP)

HEPGrid-Brazil

- Implementation of National and Regional Clusters (Tiers)
  - São Paulo Regional Analysis Center for DØ Collaboration.
  - CMS Grid Tier
    - Alberto Santoro (UERJ): Tier 2 → Tier 1
  - Gigabit Connection São Paulo–Rio
- Partnership with International Grid Iniciatives
  - CHEPREO
  - GriPhyN and iVGDL (Paul Avery), GAE (Harvey Newman), SAMGrid (DØ)
- Benefits:
  - Access to the (World) Power of Grid Computing
  - Improvement of Local, National and International Networks
  - Help to Develop Expertise in the IT Frontier
  - Enable the Research in High Energy Physics in the Near Future

São Paulo Regional Analysis Center

- Implementation in 3 phases:
  - In 3 years = 80 CPU's
  - Dual Xeon 2.4 GHz / 1 GB
  - Gigabit Switches / Interface.
- 1st Phase:
  - 1 Server + 288 GB SCSI
  - 22 Nodes + 792 GB SCSI
  - 1 Server + 4 TB RAID
- 2nd Phase:
  - Add 32 Nodes
- 3rd Phase:
  - Add 32 Nodes + 1 Server

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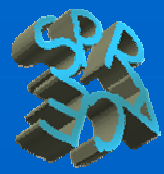
Tentative Goals



- 2004 (1st Phase)
  - ✓ Implementation of the initial cluster.
  - ✓ Instalation of DØ software.
  - ✓ Start Monte-Carlo production for DØ.
  - Integration with Grid2003
- 2005 (2nd Phase)
  - Integration of the cluster into SAM-GRID.
  - Start Reprocessing and Physics analysis for DØ.
- 2006 (3rd Phase)
  - DØ Physics analysis and other tasks.
  - Instalation of CMS software.
  - Start Monte Carlo production for CMS.
- 2007
  - DØ Physics analysis and other tasks.
  - Integration of cluster in the CMS Grid.
  - Prepare for CMS analysis.

Ganglia Cluster Toolkit
http://ganglia.sourceforge.net

Cluster Report for Thu, 17 Jun 2004 12:51:18 -0300

Get Fresh Data

Metric load_one | Last hour | Sorted descending

Physical View

Grid > SPRACE > --Choose a Node

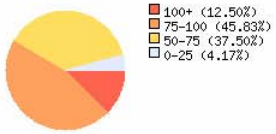
First Job processed on 23 March 2004

CPUs Total:	48
Hosts up:	24
Hosts down:	0

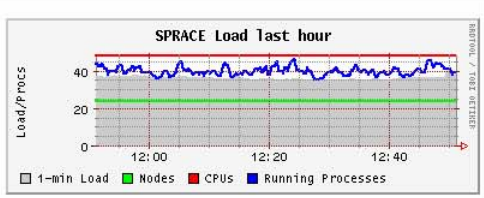
Avg Load (15, 5, 1m):
79%, 77%, 73%

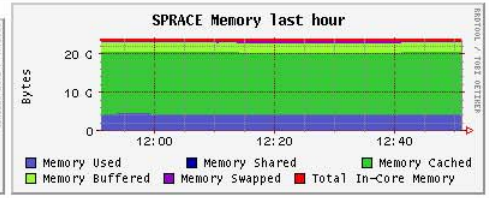
Localtime:
2004-06-17 12:51

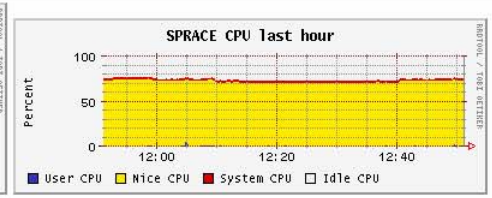
Cluster Load Percentages

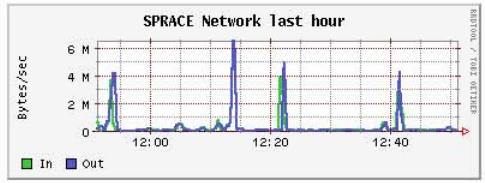


Overview of SPRACE

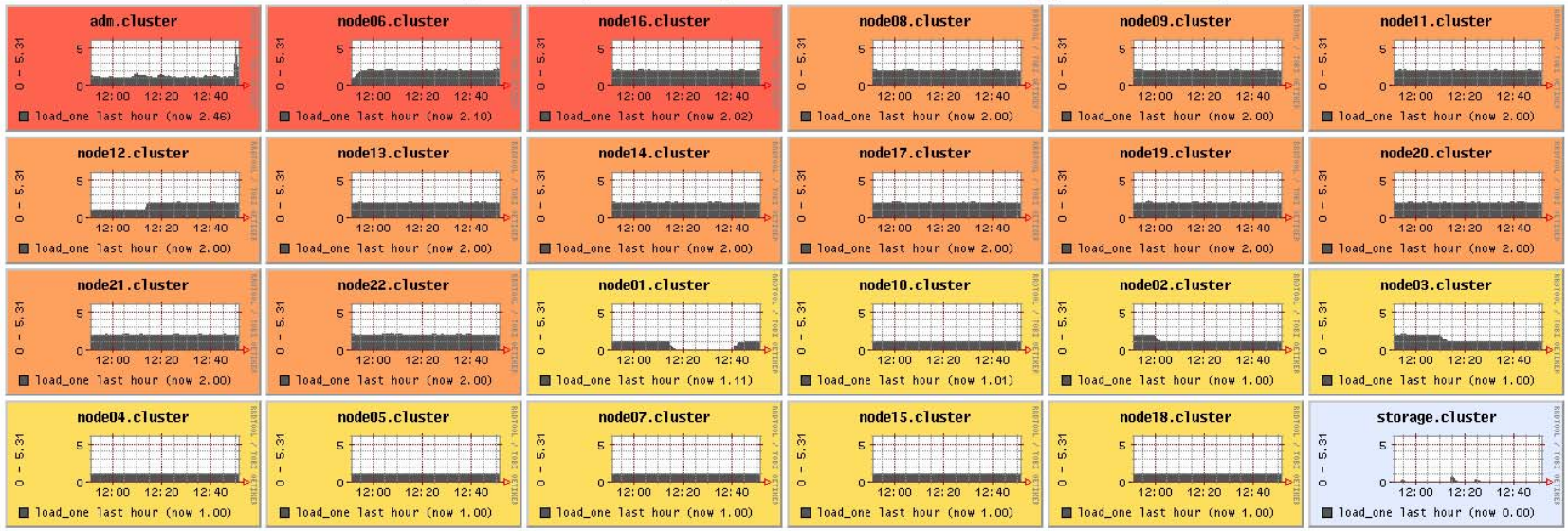






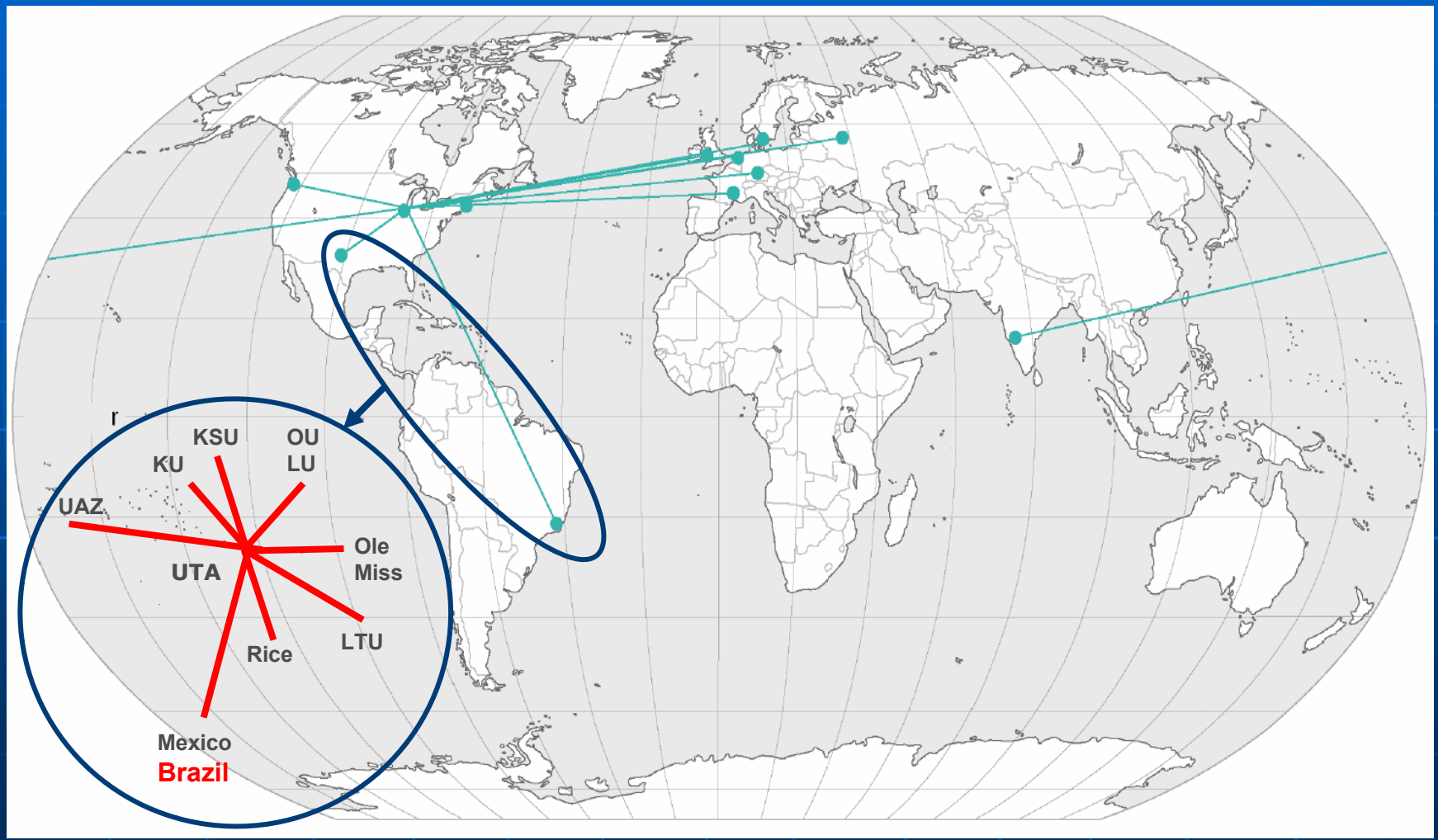


Show Hosts: yes ◉ no ○ | SPRACE **load_one** last **hour** sorted **descending** | Columns 6



(Nodes colored by 1-minute load) | Legend

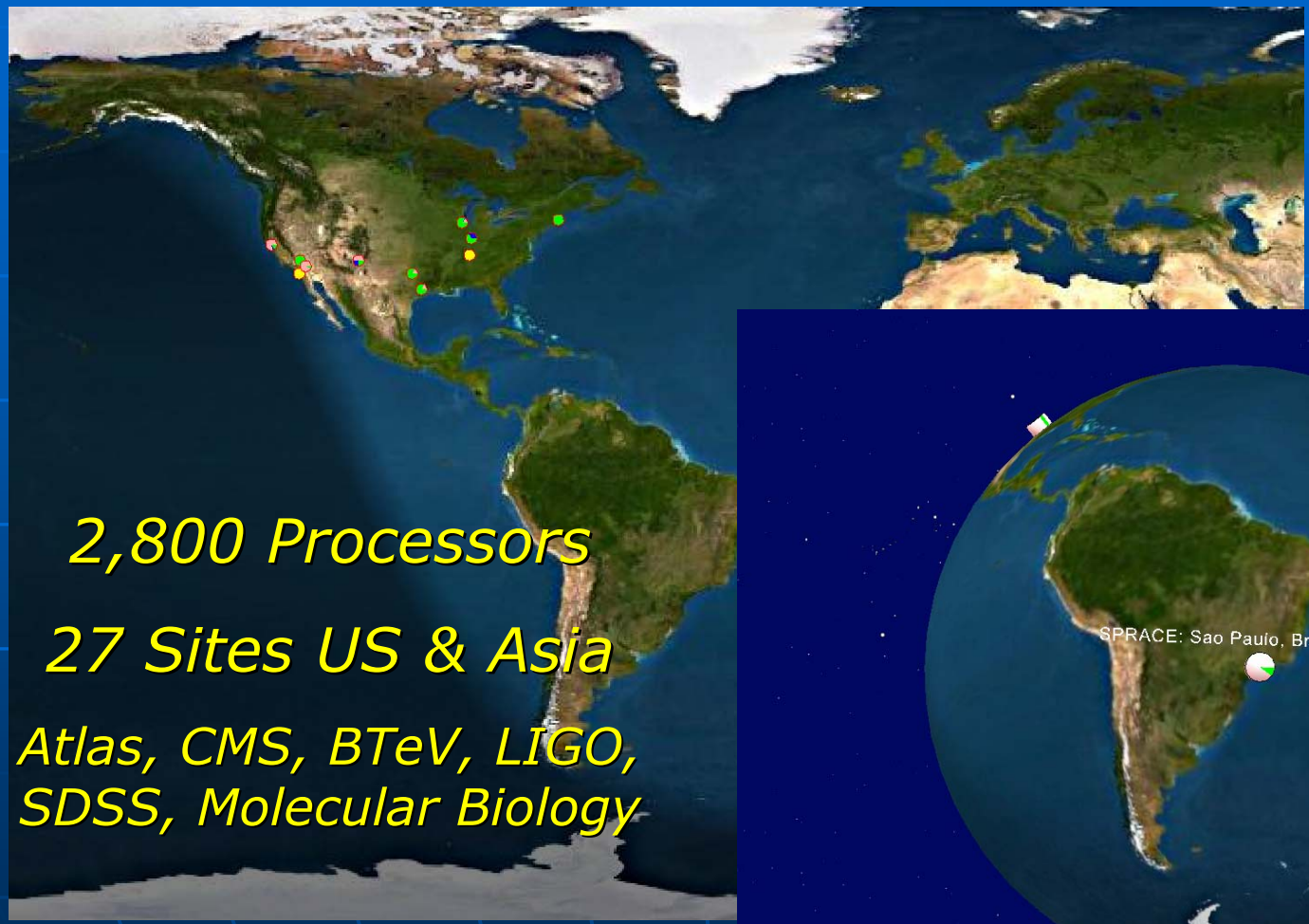
DØ Southern Analysis Region



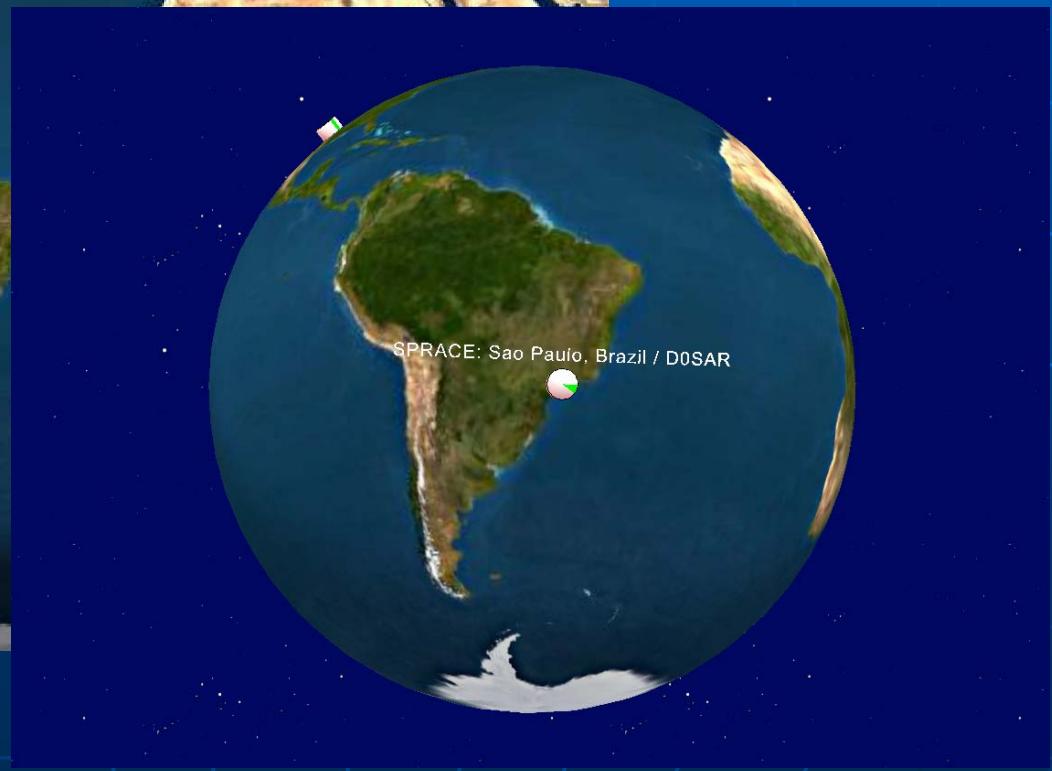
SAMGrid

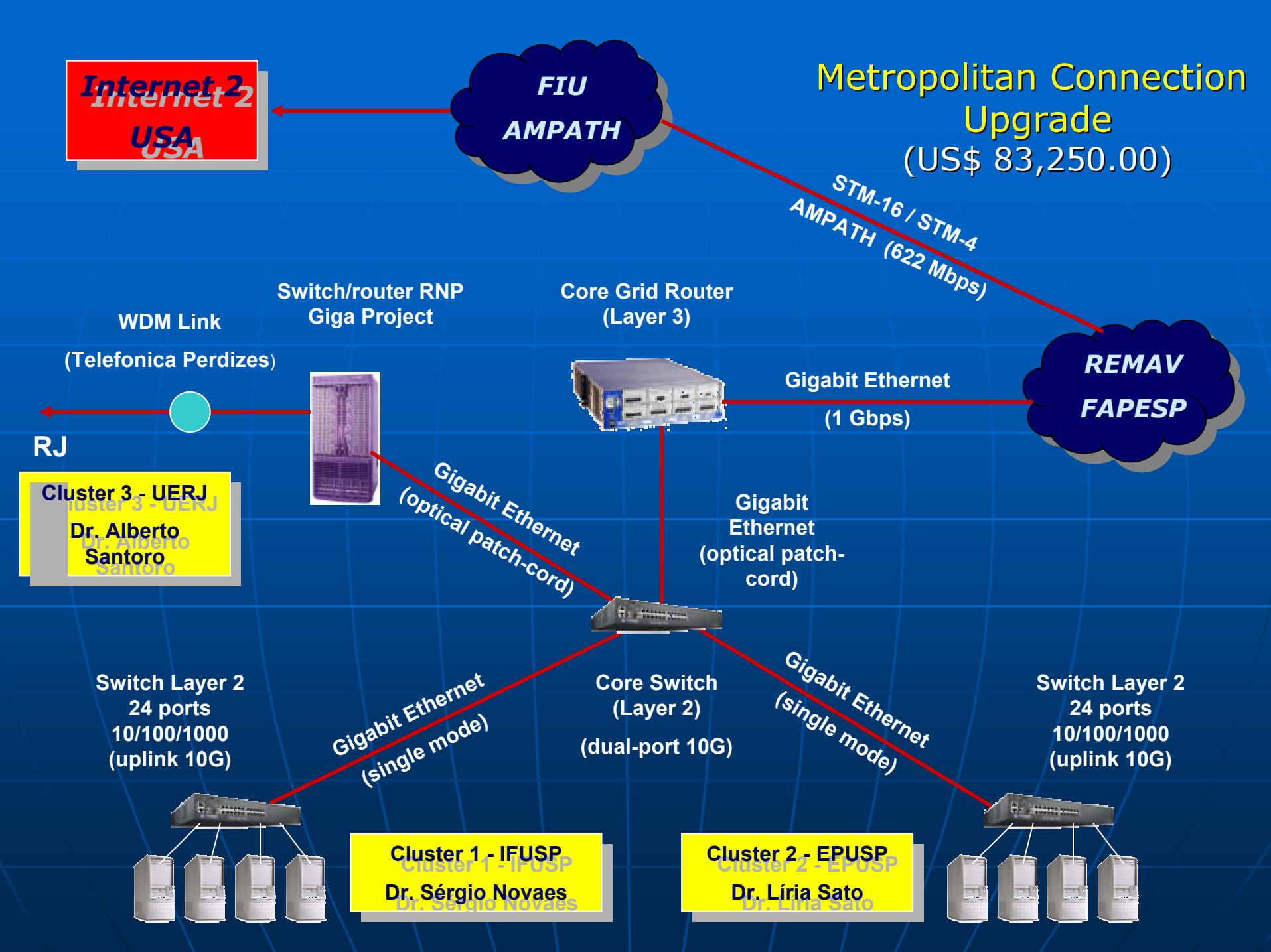
DO CDF

Grid3



MonALISA




Internet 2
USA
FIU
AMPATH
Metropolitan Connection
Upgrade
(US$ 83,250.00)
STM-16 / STM-4
AMPATH (622 Mbps)
REMAV
FAPESP
Switch/router RNP
Giga Project
Core Grid Router
(Layer 3)
WDM Link
(Telefonica Perdizes)
RJ
Gigabit Ethernet
(1 Gbps)
Cluster 3 - UERJ
Dr. Alberto
Santoro
Gigabit Ethernet
(optical patch-cord)
Gigabit
Ethernet
(optical patch-
cord)
Switch Layer 2
24 ports
10/100/1000
(uplink 10G)
Gigabit Ethernet
(single mode)
Core Switch
(Layer 2)
(dual-port 10G)
Gigabit Ethernet
(single mode)
Switch Layer 2
24 ports
10/100/1000
(uplink 10G)
Cluster 1 - IFUSP
Dr. Sérgio Novaes
Cluster 2 - EPUSP
Dr. Líria Sato

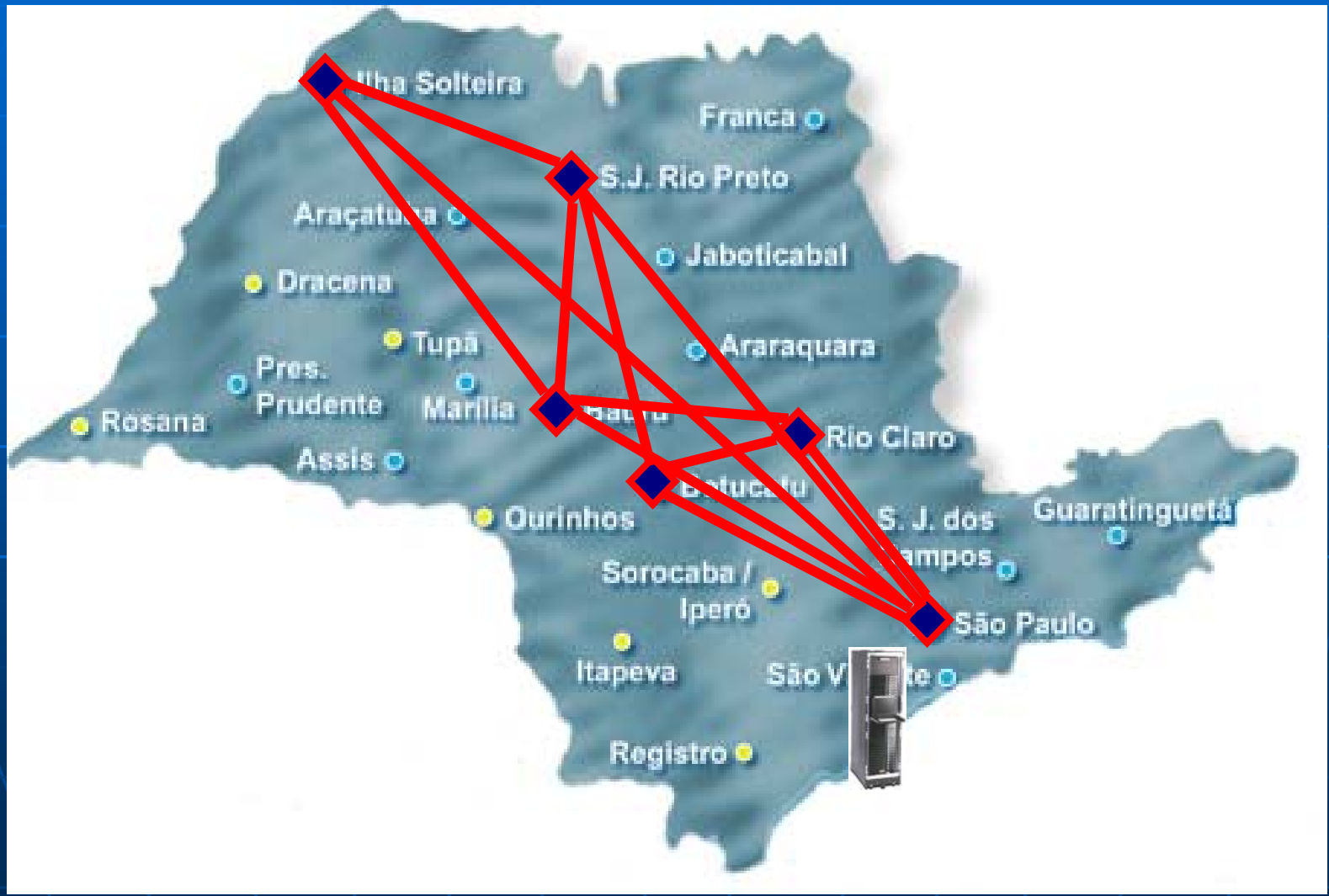
GridUNESP

- UNESP: Multicampi structure
  - Size of Michigan
  - Population of California
  - Right Profile for the Grid architecture
- Financial Support
  - "Partnership for Technological Innovation" (UNESP-FAPESP-Private)
- Implementation:
  - Primary Cluster at the new Terremark NAP at Barueri → international access without bottlenecks
  - Gradual expansion to the other unities, incorporating new resources

Research Projects

- São Paulo
  - Lattice QCD
  - High Energy Physics
- Rio Claro
  - Bioinformatics
  - Protein Folding
  - Geological and Hydrographic Modeling
- Botucatu
  - Genomics and Cancer Treatment
- Bauru
  - Vortex Dynamics in High-Tc Superconducting
  - Molecular Biology
  - Highly Correlated Electron Systems
  - Modeling of Semiconducting Ceramics
  - Characterization of Electrical Properties of Oxide Catalysers
- São José do Rio Preto
  - Structural Genoma
  - Stochastic Algorithm for Multiple Sequential Alignments
- Ilha Solteira
  - Analytical and Numerical Methods in Mechanics Engineering

Implementation



São Paulo TIDIA Program

Information Technology for the Development of Advanced Internet

- Optical Testbed
- Software Dynamical Repository
- E-Learning:
  - Uses of an advanced network for educational purposes.
  - Development of an open-source tools
  - Foster R&D on IT based solutions for education.

TIDIA E-Learning Project

- Characteristics
  - Collaborative research
    - IT applications for asynchronous teaching.
  - Products and Technology Development
    - Interactive Tools for different pedagogical environment.
  - Human Resources Development

- Organization:
  - 4 Development Laboratories
  - 12 Associate Laboratories
  - 3 working groups:
    - WG1: Methodology, Documentation, and Infrastructure.
    - WG2: Architecture, Language, and Learning Objects
    - WG3: Concept Proofing.

CEPA: Associate Laboratory

Center for Applied Research and Education

Intend to incorporate new communication and information technologies for Physics and Mathematics e-learning

- Previous Experience on:
  - Production of e-Courses and e-Book.
  - Development of Virtual Didactical Labs.
  - Development of educational object repository.
  - Development of educational portals and websites
    - http://www.cepa.if.usp.br/e-fisica/
    - http://www.cepa.if.usp.br/e-calculo/
    - http://www.labvirt.if.usp.br/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sugestões
adicionar projeto
Applets (animações)
Campo Eletrico
Campo Eletrico
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Sites e Outros Recursos
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Departamento de Astronomia
Mecânica para Licenciatura (IFUSP)
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Cerveja congela
gravidade zero
Coca - Cola
Fórum
Eletromagnetismo
Eletromagnetismo
Pôr-do-sol
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