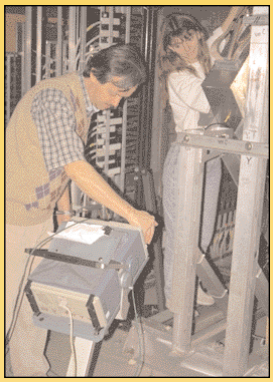
Drift Chambers For The SELEX Experiment



Carlos Escobar and Fernanda G. Garcia, testing one of the drift chambers.

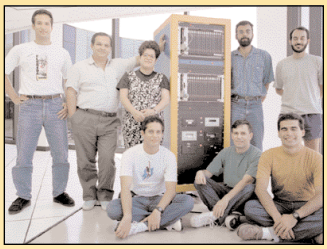
Drift chambers, usually filled with gas, are used to detect charged particles. As the particles traverse the chamber, they interact with the gas molecules, stripping off some of their electrons (ionization). Using high-energy voltage, the electrons and positive ions are accelerated to amplify the ionization process, creating an electric signal that is recorded. Analyzing the signal, the original particle track can be reconstructed.

Lead by Carlos O. Escobar, the High-Energy Physics group at the University of São Paulo constructed, operated and maintained 12 drift chambers for the SELEX experiment. From 1996 to 1997, the experiment investigated properties of particles containing charm quarks, one of the six quarks known to exist.

Brazilians @ Fermilab

Albuquerque, Ivone	KTeV, PPD/TA
Alves, Gilvan	PPD/EPP
Amaral, Jorge	RD/D0
Amato, Sandra	E769, E791
Anjos, João	E691, E769, E791, FOCUS
Barbosa, Ademar	FOCUS, Auger
Barbosa, Ricardo F.	E761, KTeV, PPD/EPP
Barreto, Jorge	D0
Bedaque, Paulo	D0
Bediaga, Ignácio	E791, FOCUS
Cardoso, Guilherme	CD/ESE
Carvalho, Hendly	E791
Carvalho, Wagner	RD/D0
Chan, Antônio	HyperCP, CDF
Chaves, Ana	D0
Christoph, Eduardo	D0
Costa, Isaias	D0, E791
Costa, Jesse	RD/D0
da Motta Filho, Hélio	D0
da Silva, Carmen	D0, CD/D0-CA
de Barros, Ana Lúcia	SELEX
de Barros, Carla	CD
de Mello Neto, João	D0, E769, E791, RD/D0
de Oliveira, Edgar	SELEX
de Oliveira, Newton	BD/AS
Dillenburg, Marcos	CDF
D'Oliveira, Augusto	E791, E829
Eijnisman, Renato	SELEX
Emediato, Luiz	SELEX
Endler, Anna Maria	E761, SELEX
Escobar, Carlos	E691, E761, SELEX, KTeV, KAMI
Fachin, Miguel	CD
Francisco, Gérson	CD
Garcia, Fernanda G.	SELEX, PPD/EPP-Mini BooNE
Gay Ducati, Beatriz	TP
Gleiser, Marcelo	TA
Gobel, Carla	E791, FOCUS
Gregores, Eduardo	D0
Guedes, Germano	FOCUS
Guimarães, Homero	PPD/EPP
Imbiriba, Breno	D0
Joffily, Mateus	D0, PPD/EPP
Kuchnir, Moyses	BD
Lima, J. Guilherme	D0, CD/D0-CA
Lukoys, Miguel	SELEX
Lungov, Thais	SELEX, D0
Machado, Raphael	D0
Maciel, Arthur	D0, PPD/EPP
Mahon, José	E761
Maia, Marcos	RD/TP
Maia, Marize	E761
Manacero, Aleardo	RD/TP
Marroquim, Fernando	E791
Martins, Carley	D0
Mendes, Marcelo	D0, RD/D0
Miceli, Ana Paula	PPD/TA
Miranda, Jussara	D0, E769, E791, RD/D0
Miranda, Mariano	CD
Montanha, José	PPD/EPP
Moreira, Lourival	RD/D0
Motta, Hélio	E769, PPD/EPP
Natalizi, Rodrigo	D0
Nicola, Marcello	RD/D0
Nigri, Hélio	CD
Nigri, Ariel	CD/ISD
Novaes, Sérgio	D0, PPD/D0
Ogari, Vitor	D0
Oliveira, Luiz	SELEX
Oliveira, Roque	CDF
Oliveira, Henrique	PPD/EPP
Ostermann, Fernanda	Education
Padula, Sandra	PPD/EPP
Paiva, Elza	CD/ISD
Peçanha, Ricardo	CD/ISD
Pepe, Iuri	FOCUS
Pereira, Antônio	D0
Piccoli, Luciano	CD/ODS
Pinto Neto, Nélson	TA
Rafael, Sá	D0
Reis, Alberto	E769, E791, FOCUS
Rodrigues, Renata	D0
Rosenfeld, Rogério	TP
Santoro, Alberto	E691, D0, E769, E791, PPD/EPP
Schulze, Bruno Richard	E769
Silva, J. Rafael	PPD/ETT
Silveira, Vanda	RD/TP
Simão, Fernando	E791, FOCUS
Simonetti, Roberta	E761
Solano, Carlos	E791
Souza, Moacyr	E691, D0, E769, E791, CD/D0-CA
Srivastava, Monique	SELEX
Sznajder, André	RD/D0
Thober, Darío	KTeV
Torres, Márcia	E821
Valois, Roberto	CD
Vaz, Mário	D0
Waga, Ioav	RD/TP
Whately, Lauro	CD/ISD
Zimmermann, Sérgio	CD/ESE
Zukanovich-Funchal, Renata	SELEX, KTeV

Developing Parallel Computers



Next to an ACP parallel computer component are: Ariel Nigri, Alberto Santoro, Carmem Silva, Jorge Amaral, Lauro Whately (back row, from left), Hendly Carvalho, Marcelo Mendes and Ricardo Peçanha (front row, from left).

Starting in 1996, the E791 experiment at Fermilab recorded 20 billion interactions. To process this enormous amount of data (50,000 gigabytes), the High-Energy Physics group at Brazil's CBPF laboratory collaborated with Fermilab's Computing Division to develop a powerful parallel computer. Based on fast RISC processors (CPU R3000), they constructed a parallel computer called the Advanced Computing Program II. The processors communicated via a VME branch bus running a ported version of the UNIX operating system.

Located at CBPF, the ACP II helped to reconstruct 250,000 particle collisions that created charm quarks. The results significantly enhanced our understanding of the forces and production mechanisms behind processes involving charm quarks.