



# Proposal of Mexican participation in SuperB

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For the Mexican Group



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# Introduction



- High Energy Physics in Mexico is the second one community, in growth.
- There has been Mexican participation in the following experiments Selex, Focus, D0, CDF, HAWK, AUGER, CMS, ALICE, whole community around 130 people
- Participation in big experiments is limited by the amount of budget and people.
- Some experience in detector construction ACORDE a plastic scintillator based detector, operating in ALICE.
- SuperB is a great opportunity for us and we would like that it becomes one of the main experiments in Mexican HEP community.
- High Energy theoretical/phenomenology community will participate in this project.



# Funding in México



Main source is:

CONACYT : (National council of science and Technology)

- Yearly Basic Science projects.

1.2 M \$MXN (70k Euros) per individual project (3 years period)

**4.4 M \$MXN (258k Euros) per project ( 4 years period)**

- Extra especial projects

Very variable, depends of lobbying

- University funds (Per researcher)

(150k-200k \$MXN ) (7k-9k Euros) per year

# Participant Institutions





# Participants a brief description



## Universidad Autónoma de Sinaloa (UAS) Facultad de Ciencias Físico-Matemáticas

- **Dr. Pedro Luis Manuel Podesta:** Experience in Data Analysis Bs,Bd in D0, offline. Currently doing b physics in ALICE. Interested in Data analysis, Detector development, Software development.
- **Dr. Idefonso Leon Monzón** Experience in Hardware, Developing plastic scintillator, Instrumentation. Interested in detector development.
- **Dr. Roberto Millan Almaraz.** (Electronic) Experience in Control, FPGA programming. Interested in develop electronics and transfer technology.

We had a detector lab and a small cluster.

1 student in PhD, two doing master, some bachelor students



# Participants



## Universidad de Guanajuato (UG) Division de Ingenieria y Ciencia Exactas.

- **Dr. Marco A. Reyes Santos** : Experience in Data analysis, spectroscopy of light mesons and charm photoproduction, Focus collaboration. Interested in data analysis, Detector construction.
- **David Delepine**: Experience in phenomenology Lepton number violation in B, CP violation in B. Interested in model developments.
- **Gerardo Moreno Lopez**: Experience in data analysis. Interested in Data analysis.

**Infraestructure:** Laboratory of detectors.

## Centro de Investigación y Estudios Avanzados del Instituto Politecnico Nacional (CINVESTAV), Departamento de Física

- **Dr. Gabriel Lopez Castro** Experience in phenomenology, tau, charm and bottom physics,. Interested in model predictions about these subjects.
- **Dr. Eduard de la Cruz Burelo**: Experience in Data Analysis OmegaB, LambdaB, in D0, Currently doing B physics in CMS. Interested in Data analysis.



# Participants



## **Benemerita Universidad Autonoma de Puebla (BUAP), Facultad de Ciencias Físico Matemáticas**

- **Dr. Arturo Fernandez Tellez** : Detector Construction, ACORDE detector in ALICE, Interested in Detector Development, Data analysis.
- **Dr. Mario Ivan Martinez**: Experience in DCS , Detector design, Interested in Detector Design
- **Dr. Sergio Vergara Limon**: Experience in FEE Electronics. Interested in work in electronic.
- **Dr. Azucena Bolaños Carrera**: (PosDoc), Experience in Data analysis: Interested in MonteCarlo and Data analysis.

Infraestructure

Detector lab, Electronic Lab, Computing (Modest)

Founding: Waiting for approval from CONACYT.





# Participants



## Universidad Nacional Autónoma de Mexico (UNAM), Instituto de Física

- **Dr. Genaro Toledo Sanchez:** Experience in phenomenology, tau physics and vector mesons, interested in develop models to data in superB.

**Infrastructure:** Laboratories detector, more people will be involved eventually, since this is the biggest University in Mexico.

## Universidad Autónoma de San Luis Potosi (UASLP)

- **Dr. Jurgen Engelfried:** Experience in Selex, charm physics, and RICH detectors. Interested in detector development, data analysis

**Infrastructure:** Detectors Lab.



# Main Objective



The main objective of the proposal is to conform a Mexican group.

- Build part of the IFR.
- Contribute to physics Book.
- Do Data analysis.

Topics of interest:

CP Violation in Tau, Tensorial mesons, D and B mesons

D. Delepine, G. L'opez Castro y L. T. L'opez Lozano, Phys. Rev. D72, 033009 (2006);  
D. Delepine, G. Faisel, S. Khalil y G. L'opez Castro, Phys. Rev. D74, 056004 (2006);  
G. Calderon, D. Delepine y G. L'opez Castro, Phys. Rev. D75, 076001 (2007).



# Plan



## First year, hardware ( 37 k )

We want to build a couple of modules validate and establish the procedure to characterize them. For this we will use cosmic rays.

Electronics we are considering to be acquired in the project :

- VME Computer card
  - VME QDC
  - VME 4 channels
  - Fan in Fan Out
  - High Voltage Supply
  - Low Voltage supply
  - VME TDC
- (Around 33 K Euros )

Material to build the module

Plastic scintillator, fiber, material, electronics, SPM power supply, (0.832 K euros per module)

We already have a VME crate plus some cards, this is now being used to build a Beam monitor detector at ALICE



# Plan



First year, computing (20 k€)

Storage Element (15 TB )

2 servers

Rack and no break

Working nodes will be provided by an existing cluster (UAS) of 20 nodes  
(Dual core cpu, 4 GB ram, SCL 5.0)

Problem we have now is network connection, working on this with university collaboration with superB will give us good arguments to request more bandwidth.

This is a first step we will request more on different projects.



# Plan



## **Second year (33 K Euros )**

- Build and test 20 modules in FCFM.

## **Third year (66 K Euros )**

Move the test stand to BUAP.

- Build 20 modules in BUAP.
- Build 20 modules in UGTO.

## **Fourth year (33 K Euros )**

- Build 20 modules in CINVESTAV.
- Send all of them to superB ( Shipping is considered in the project)



# Mobility Expenses



Traveling is an important part in an effective collaboration.

We are considering 13.7 K Euros per year considering one visit to collaboration meeting, visits for students etc.

Total is 54 K Euros.

Individual projects will be the main sources to get funding to this activities.

There is some modalities projects that had work very well for us like Helen, E-planet. We would like to know if it is possible to do something similar.

Material for construction and shipping (142 k),  
Equipments ( 37K )  
Mobility ( 54 )  
Computing ( 20K)  
Total (253)



# Conclusions



- A Mexican group interested in participating in the superB project has been conformed.
- The project is submitted and waiting for approval.
- Additional funding to individual projects are expected in the next Years, mainly for mobility.
- We would like to make valuable contributions to the experiment.
- We are building a web site with all the information regarding The Mexican group.