

# Review of JSPS-CNRS project

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JSPS-CNRS joint projects

Up to 2 years, funding travel between France and Japan

Application by Kawagoe-san and myself in september 2010

## **Electromagnetic calorimetry for a Linear Collider**

Project accepted for years 2011-2012

ends at end of this year

This presentation should be useful for the writing of the  
final research report



## ***PROJECT PROPOSAL***

To be completed jointly by the coordinators

Summarize the project in no more than 10 lines, specifying the geographical locations of the proposed research (in French and English):

A future electron-positron linear collider will give important insights into the nature of physics at Tera-electronvolt energies. Worldwide studies are underway to design such a collider, and the detectors which will record the results of the particle collisions. This project will develop a design for the electromagnetic calorimeter (ECAL) to be used in this detector. The two groups making this proposal have developed different technical designs for such an ECAL (silicon sensors in France, scintillator and Multi Pixel Photon Counters (MPPC) in Japan). The two approaches have different strengths and weaknesses. This research project will study the possibility of a combined hybrid ECAL design, conserving the strong points of each of the two approaches and will improve the synergies. This will involve simulation studies (in both France and Japan), sensor development with industrial partners (mostly in Japan), and studies of hybrid ECAL integration (mostly in France).

Project members:

Kiyotomo Kawagoe  
Tohru Takeshita  
Akiya Miyamoto  
Hiroaki Ono

Daniel Jeans  
Remi Cornat  
Vincent Boudry  
Jean-Claude Brient  
Marc Anduze  
Roman Poeschl  
Julien Bonis

We have had several meetings in France and Japan

- May 2011: @ LLR, LAL
- Nov 2011: @ Kyushu and HPK
- Takeshita/Kotera -> LLR ??
- Dec 2012: @ Tokyo and HPK

## **Research schedule**

months 1-6:

- test and validation of hybrid ECAL simulation models
- establishment of sensor testing station in Japan
- further discussions about sensor design with silicon sensor producers

months 7-12:

- development of reconstruction algorithms for hybrid ECAL
- possible order and delivery of a sample of new design sensors
- engineering study of hybrid integration issues

months 13-18:

- performance study of different hybrid ECAL designs
- measurement of new sensor properties on test bench
- continuation of integration study

months 19-24:

- possible second iteration of sensor design
- further performance studies of hybrid ECAL
- preparation of research report

## Simulation studies

- test and validation of hybrid ECAL simulation models

Mokka model for Hybrid ECAL written (LLR) and tested (LLR, Japan)  
recently further extended (Tokyo)

- development of reconstruction algorithms for hybrid ECAL

HybridSplitter (extension of Kotera's split stripping to Hybrid case)  
written (LLR)

- performance study of different hybrid ECAL designs
- further performance studies of hybrid ECAL

Studies underway at Kyushu, LLR, Tokyo  
First results presented in DBD

## Silicon sensors

- establishment of sensor testing station in Japan

Test bench well established @ Kyushu

- further discussions about sensor design with silicon sensor producers
- possible order and delivery of a sample of new design sensors
- measurement of new sensor properties on test bench

New design sensors ordered, delivered and tested  
More or less aggressive laser cutting of sensor  
Split guard rings  
No guard rings

Will hear about measurement results at this meeting

- possible second iteration of sensor design

To be discussed in the next couple of days

# Integration

- engineering study of hybrid integration issues
- continuation of integration study

Full CAD (CAO) model of scintillator slab in alveolar structure  
(Shinshu, LLR)

“Technological prototypes” of both silicon and scintillator

“U” carbon fibre structure (from LLR) used for construction of first  
scintillator technological prototype layer (Shinshu)

Use of \*ROC chips (Omega/LAL) in both technological prototypes

Common DAQ system used for both techno. protos  
(mostly developed @ LLR and DESY)

- preparation of research report

Needs to be done soon! (by whom?)



## The future of FR-JP joint ECAL studies

Close cooperation has been established by this project  
long may it continue

Travel funding is always helpful

Probably difficult to re-apply to JSPS/CNRS program in the next year (?)

Other programs?

Hardware-specific TYL (FJPPL) ?

We can discuss this more tomorrow.