Our first task is the compilation of a document summarizing Linear Collider Detector R&D efforts. It could also help new groups (interested to join the ILC) to learn about the current landscape of the LC R&D activities.

With this mail we would like to ask if you would be willing to send us a document of a few pages, summarizing the LLR R&D activities involving the Si ECAL and specifically addressing the following points:

\* Major R&D efforts (past and present) and recent developments since ILC DBD (with publications/references to major results);

ELECTROMAGNETIC Calorimeter

> First development of PFA for dedicated detector (TESLA Report)

> First prototype of High granularity electromagnetic calorimeter (“physics prototype”, see publications in the CS report).

> First design of ECAL silicon – tungsten for a full scale detector (From TESLA report to DBD 2013)

> R&D on scalable technology for all the involved large detector aspects (integration of embedded readoud chips, on thin supporting electronics boards, in self-supporting tungsten-Carbon mechanical elements ensuring the cooling and protection; all made of exchangeable elements with a quality control procedure; the associated DAQ).

> Realisation of a large self-supporting W-Carbon fiber structure with integrated stress monitoring (using Fiber Bragg Gratting)

> Recently: tests of 1st base sensor units of the technological prototype in beam

PFA:

> Development of Mokka an overlayer of the GEANT4 used for ILD, CLIC detectors, CALICE TB, …

> Reconstruction tools adapted to the high granularity calorimeters (photon reconstruction [GARLIC], Advanced clustering [ARBOR], event displays [DRUID])

ILD integration & optimisation

> for the DBD: integration of all the ILD elements, placement of services, thorough estimation of total cost of the detector

> since DBD: re-optimisation of the ILD dimensionning, esp. for the Si-W ECAL using full PFA reconstruction.

\* Engineering challenges:

> Silicon wafer cost reduction when used for calorimetry; direct contact with producers established (Hamamatsu, On-Semi, …).

> A chip with the good dynamic, noise, power dissipation (using power pulsing), etc;..

> Integration in a compact device, ensuring all the requests (precision: electronic and mechanic, heat production, reliability)

> Industrialisability of solutions; scalability of tests for a 100M channel detector.

\* Detector R&D plans for the coming years;

> Impossible. No way to see beyond next year (see IN2P3 recommendation)  
To recall, all the R&D will stop at the end of 2016, if there is no decision in Japan

\* List of collaborating institutes (contributing to this R&D technology);

If I put a cut on group with ≤1 FTE on   
It remains only LPNHE-Paris, LAL, Univ. of Tokyo and Kyushu University

\* Perspectives of this R&D for applications beyond the ILC (with references if technology is already used in the other projects)

> CEPC, TLEP and directly today on CMS upgrade

> The compact Silicon-W design has been used in the PAMELA satellite   
(very similar to physics prototype)