

## **PART 2: Silicon Detectors / Nordforsk Detector Course**

### **Tuesday December 2<sup>nd</sup> – Friday December 5<sup>th</sup>, 2008**

#### **LECTURES: Tuesday 2.12:**

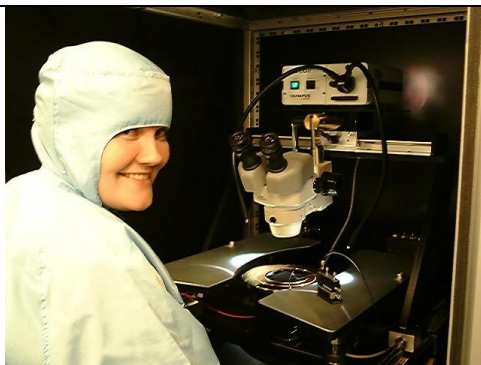
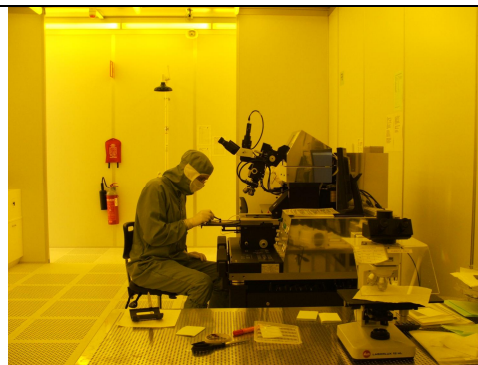
1. Dr. Jaakko Härkönen, Finnish Academy Research Fellow, CERN:  
Manufacture and characterization of silicon detectors.
2. Dr. Michael Moll, CERN:  
Development of radiation hard detectors in the framework of CERN RD50.
3. Dr. Lenny Spiegel, FERMILAB:  
Case study: Fermilab CDF-experiment.

#### **LABORATORY EXERCISES: Wednesday 3.12, Thursday 4.12, Friday 5.12:**

##### **TASK A:**

##### **Detector processing at Micronova**

The group visits the clean rooms at Micronova, Helsinki University of Technology HUT and studies the complete detector processing procedure. In addition, the group will process microstructures on silicon wafers by lithography. Supervisor: Dr. Esa Tuovinen, HIP, assisted by Heikki Viljanen, HIP  
PLACE: Micronova, Tietotie 3, 02150 Espoo



##### **TASK B:**

##### **Electrical characterization of detectors**

Using the probe station situated in the clean room of the Detector Laboratory, the group will measure current-voltage and capacitance-voltage characteristics from irradiated silicon detectors. The radiation hardness properties of different kind of detectors are compared with each other. Supervisor: PhD Ivan Kassamakov, HUT  
PLACE: Detector Laboratory Clean Room

##### **TASK C:**

##### **Particle tracking by Finnish Cosmic Muon Crack (FinnCRack)**

FinnCRack mimics a slice of CERN CMS Outer Barrel Tracker. It consists of eight levels of silicon detector modules and CMS prototype DAQ. The group will use FinnCRack to measure and analyze tracks of cosmic muons. Supervisor: Lic.Sc. Teppo Mäenpää, HIP, assisted by Henri Moilanen, HIP  
PLACE: Detector Laboratory



## EXERCISE REPORTS:

When not participating in exercises, the group prepares reports of the exercises. Room A311 is available – with some minor exceptions that will be announced later.

## LOGISTICS PLAN:

The students divide themselves to five (5) groups of four (4) persons each: G1, G2, G3, G4 and G5.

	<b>TUESDAY 2.12</b>	<b>WEDNESDAY 3.12</b>	<b>THURSDAY 4.12</b>	<b>FRIDAY 5.12</b>
9-13	Exactum BK106  LECTURE 1: Dr. Jaakko Härkönen: “Manufacture and characterization of silicon detectors”	TASK A – G1 TASK B – G2 TASK C – G4	TASK A – G3 TASK B – G5 TASK C – G2	TASK A – G2 TASK B – G3 TASK C – G1
	LUNCH	LUNCH	LUNCH	LUNCH
14-18	Physicum E206  LECTURE 2: Dr. Michael Moll: “Development of radiation hard detectors in the framework of CERN RD50 research programme”  LECTURE 3: Dr. Lenny Spiegel: “Case study: FERMILAB CDF-experiment”	TASK A – G5 TASK B – G4 TASK C – G3	TASK A – G4 TASK B – G1 TASK C – G5	Physicum A311  Dr. Paula Eerola: Farewell