Activity of ALICE-Korea group

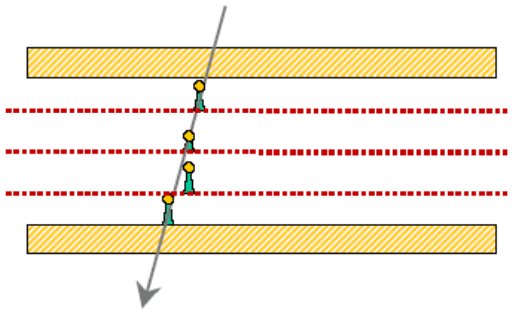
Do-Won Kim
Kangnung National University
CERN, April 23, 2007

- R&D of the Multi-gap RPC
- Participation in the ALICE-TOF project
- Contribution to the ALICE offline project
- Support from the Korean MoST
- Activity of ALICE-Korea, 2007

Korean institutions in ALICE
Kangnung National University
Sejong University

R&D of the Multi-gap RPC

<R&D of MRPC>



Napoli in 1997, Presentation of MRPC by C. Williams

January-February 1998 at CERN
Team: D. Hatzifotiadou, J. Valverde, C. Williams, E. Zebalos (CERN)
D.W. Kim, S.C. Lee (Kangnung)

Production of two RPCs with 3-gaps of 1.2 mm (24 cm × 24 cm active area)

Measured the performance using cosmic rays
Obtained satisfactory results from this first trial:

- Time resolution : 4 ns FWHM
- Efficiency plateau > 2 kV
- Time walk < 900 ps/kV (2.5 ns/ 3 kV)

Publication in NIM-A 'Effect of adding SF_6 to the gas mixture in a MRPC'

- Presentation in Vienna Conference
- Presentation in the KPS meeting – as a promising device for LHC

R&D of the Multi-gap RPC

<Production of a Big MRPC for LHC>

Late-1998 at CERN, - more collaborators -

Team: D. Hatzifotidou, J. Valverde, C. Williams, E. Zebalos (CERN)
D.W. Kim, S.C. Lee (Kangnung), J. Choi (Pohang)
E. Platner, J. Roberts (Rice)

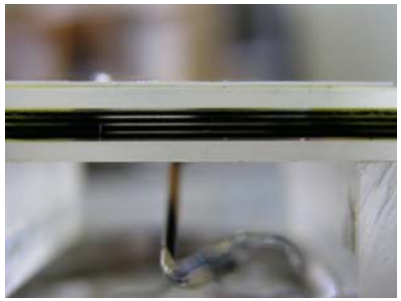
Production of a big (3.4m ×1.3m) MRPC with 4-gaps of 0.7mm
as muon trigger device of an LHC experiment

Measurement of the performance using PS-T10 beam
Time resolution : 1.9 ns FWHM
Time walk : 400 ps/kV
Rate capability : 15 kHz/cm^2 (at 95% efficiency), Dark current : 50μA/m^2

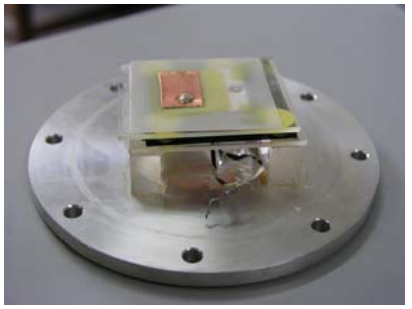
Publication in NIM-A ‘A very large multi-gap resistive plate chamber’

Showed suitability of the MRPC for the construction of large area modules.


MULTIGAP 2000
4*0.3 mm. Multigap RPC
3 square metre active area
LAA Project Oct. 1998



R&D of the Multi-gap RPC



<Small gap MRPC with very high time resolution>

1999 at CERN - better resolution / smaller gaps -

N. Y. Kim (Kangnung) started working at CERN as World Laboratory fellow (supervisor C. Williams)

Production of cell, 5-gap RPC with 0.22 mm gap size

Obtained 70 ps Time resolution (T-A correction) :
Satisfy the requirement of ALICE TOF detector

Discussion on the use of MRPC for ALICE TOF project

Presentation in RPC workshop, Bari (1999)

Publication in NIM-A 'The multigap resistive plate chamber as a time-of-flight detector'

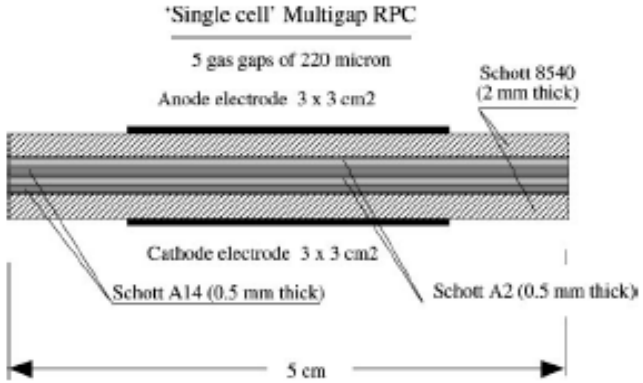
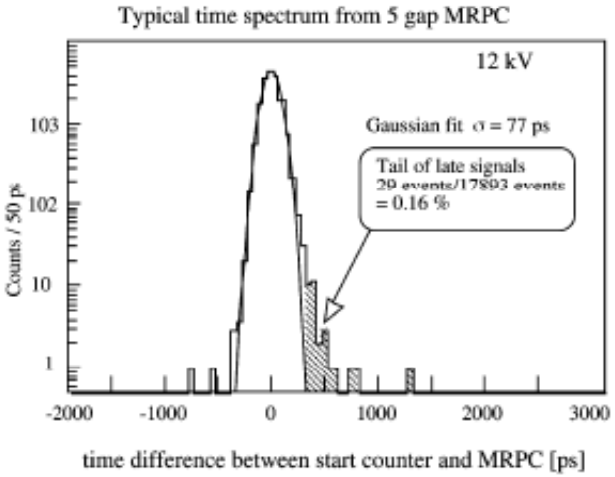


Fig. 1. Cross-section of a multigap RPC tested for time-of-flight purposes.



Participation in the ALICE-TOF project

<INFN-Bologna joins ALICE with TOF project>

Spring 2000

INFN-Bologna, Salerno groups join ALICE with the full responsibility of the ALICE-TOF construction, Collaborating institutions :

ITEP-Moscow

Kangnung National University

Pohang Accelerator Laboratory

Kangnung and Pohang have been accepted as ALICE collaborators

MoU between INFN-Bologna, Salerno and Kangnung, Pohang established.

Efforts of World Laboratory to help Korean colleagues financially

May 14, 2000
Sook Hyun Kim, MoST

Participation in the ALICE-TOF project

<Collaboration with INFN-Bologna for ALICE - TOF R&D>

No Korean source of funding for this experiment at CERN.

Italy-Korea S&T cooperation agreement signed in Roma (2000) between
Ministero degli Affari Esteri - Italia
Ministry of Science and Technology – Korea

- thanks to Prof. Mario Scalet, the Science Attaché of the Italian Embassy in Seoul, now in European Commission - DG RTD, Directorate International Cooperation -

Based on this agreement, we got funded for the exchange of scientists (2001-2004)

Yearly budget of ~ 10,000 CHF for travel from MoST
+ Staying expenses in Bologna from the Italian government

Allowed Kangnung scientists to keep participating in the R&D at Bologna/CERN (strips, electronics, beam test) and to do Gamma Irradiation test at Pohang Accelerator Laboratory

(D.W. Kim, S.C. Lee, K.S. Lee, J.H. Jeong + R. Nania)

Continuous help from World Laboratory to support fellows from Korea

Dr. Y.W. Baek (CERN, 2000-2002), Strip production, Radiation hardness, Beam test
D.H. Kim (CERN, 2003-2004), Strip production, Beam test
J.S. Kim (CERN, 2004-2007), Strip production(EEE), TOF supermodule assembly and Beam test
Y.K. Jo (CERN, 2007-), TOF supermodule assembly and Beam test

Participation in the ALICE-TOF project

<Outcome of the Collaboration with INFN-Bologna for ALICE - TOF R&D>

Scientific publications in NIM-A (2004)

Study of gas mixtures and ageing of the multigap resistive plate chamber used for the Alice TOF
(Eugenio Scapparone)
Design aspects and prototype test of a very precise TDC system implemented for the Multigap RPC of the ALICE-TOF (Pietro Antonioli)
Latest results on the performance of the multigap resistive plate chamber used for the ALICE TOF
(Despina Hatzifotiadou)
Operation of the Multigap Resistive Plate Chamber using a gas mixture free of flammable components
(Do-Won Kim)

Training of students & researchers

N.Y. Kim > Ph.D. student (physics) in Jungang University
K.S. Lee > Ph.D. student (physics) in Kangnung National University
Y.W. Baek > research associate, CMS-MUON group at CERN, University of Wisconsin
J.H. Jeong > researcher, PSI, Atomic Microscope co.
H.T. Jung > Ph.D. student (physics) in Kangnung National University
D.H. Kim > graduate student (physics) in Sung Kyun Kwan University, ***supervisor : Professor Y.I. Choi***

Participation in the ALICE-TOF project

<Collaboration with INFN-Bologna for TOF detector production>

Italy-Korea cooperation agreement renewed in Seoul (2003) between
Ministero degli Affari Esteri - Italia
Ministry of Science and Technology - Korea

Funding for the **exchange** of scientists approved (2004-2007)
Yearly budget of ~ 5,000 CHF for travel from MoST
+ Staying expenses from the Italian government

Helped Korean scientists to keep activity in **MRPC R&D** : test with various gas mixtures
H.T. Jung, D.W. Kim, S.C. Lee, K.S. Lee

Support from the INFN-Bologna for Korean students for 3 years
H.N. Kim and W.W. Jeong (2004, 2005),
E.G. Kang and E.H. Jo (2006)
in Bologna, ALICE-TOF **production** and **test** of **1,638 strips**

World Laboratory supports one fellow from Korea
Y.K. Jo (2007-) at CERN for **more R&D on MRPC (~ 10 ps resolution)**

Contribution to the ALICE offline project

<Collaboration with ALICE Offline Team at CERN>

In May 2004 Korean MoST approved funding Collaboration of Koreans with **EGEE** on
High Energy Physics
Bioinformatics with a total budget of 150,000 CHF/yr

- thanks to Yves Schutz and Fabrizio Gagliardi @CERN and T.H. Kim and S.B. An @ KOSEF -

CKSC (represented by S. Kim) has been formed :
Chonnam National University - Bioinformatics
Kangnung National University - ALICE - TOF
Sejong University - ALICE offline, HEP theory

A Korean engineer worked at CERN supported by the MoST working in **ALICE offline gr.**
C. Y. Choi (2004 - 2007) on the development of the system for
- **remote installation** of the software for GRID
- **monitoring** remote machines on the GRID
(supervisor, F. Carminati)
(2007 -) EGEE Project Associate, **middleware development for Bio-info**

Participation in the **ALICE data challenge** with the **Linux clusters** in **Sejong : New ALICE Collaborator!**
But still Without any Official Agreement (MoU)

Towards CERN-Korea Cooperation Agreement

- June 2004, Review of the Italy-Korea programme,

- Dr. Ki-Joon Jung, director of the cooperation with Europe in MoST and the referee from the funding agency (KISTEP) appreciated our cooperation with INFN-Bologna.

- Presented the interest of Cooperation with CERN

-Transmitted CERN's interest to sign the Cooperation Agreement with Korea (suggested by D. Blechschmidt)

- Diether's visit to Korea in July 2004

- Korean delegation's visit in October 2004 (KISTEP)

- New director Joohan Kim's visit to CERN in March 2005....


63
2005 3 9

Support from the Korean MoST

<CERN-Korea cooperation agreement signed on October 25, 2006>

Big efforts of the officer H.T. Jang, the deputy director for the cooperation with Europe in MoST; preparation of document, defense of CERN-Korea fund

~ 1 M Euros for 2007 → about 0.2 M Euros for ALICE-Korea

Addendum No. 8
to the
Memorandum of Understanding
for Collaboration in the Construction of the ALICE Detector

Signed the same day,
by KOSEF (Dr. C.I. Eom)

Support from the Korean MoST

Kangnung National University

H. T. Jung, W. W. Jung, E. G. Kang, *D. S. Kim*, *D. W. Kim*, H. N. Kim, K. Lee, *S. C. Lee*, J. S. Kim
\+ *Y.W. Baek*

Sejong University

C. Y. Choi, B. H. Han, *D. S. Hwang*, H. G. Kim, *S. Kim*

6 Ph.D's for M&O counting

Financial Provisions

Item	Amount (kCHF)
Construction of TOF detector	100
R&D of MRPC	50
ALICEcomputing Grid	50
Common Projects	100
Total	300

Activity of ALICE-Korea, 2007

Experimental :

Study of the Λ_c^+ particles – in collaboration with INFN-Bologna –
(S.C. Lee + D.S. Kim + 4 students in Kangnung)

Assembly and characterization of the ALICE TOF detector
(Y.W. Baek + 1 student at CERN)

Measurement of Λ^0 particles
(D.S. Hwang + 1 student in Sejong)

Computational :

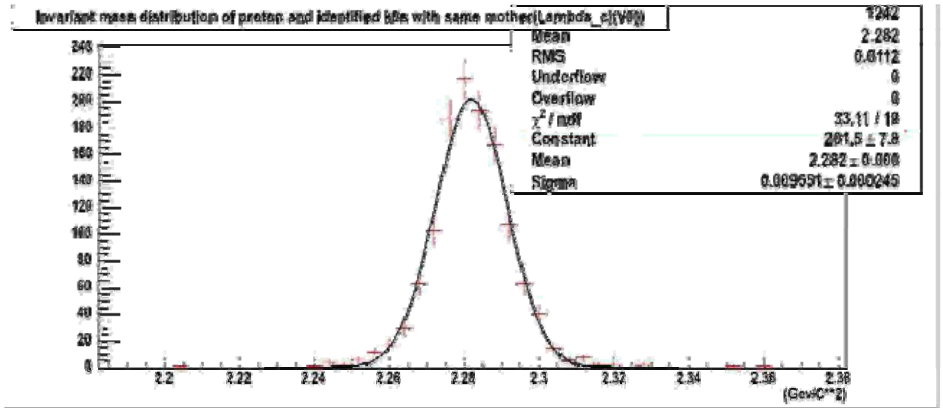
ALICE computing GRID – in collaboration with KISTI –
(S. Kim + 2 students in Sejong)

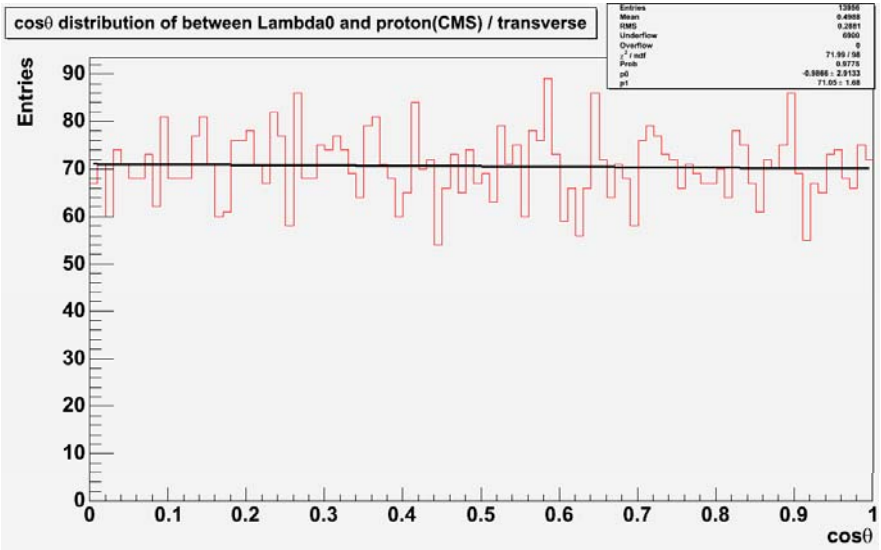
Plan to sign WLCG MoU in October 2007, for an ALICE Tier 2
KISTI (Korea Institute of Science and Technology Information)
(S.W. Hwang + 2 engineers of KISTI)

Theoretical :

Single spin asymmetry, Temperature effects on heavy quarkonium, Lattice QCD study
(D.S. Hwang, S. Kim in Sejong)

Activity of ALICE-Korea, 2007





Running Aliroot,

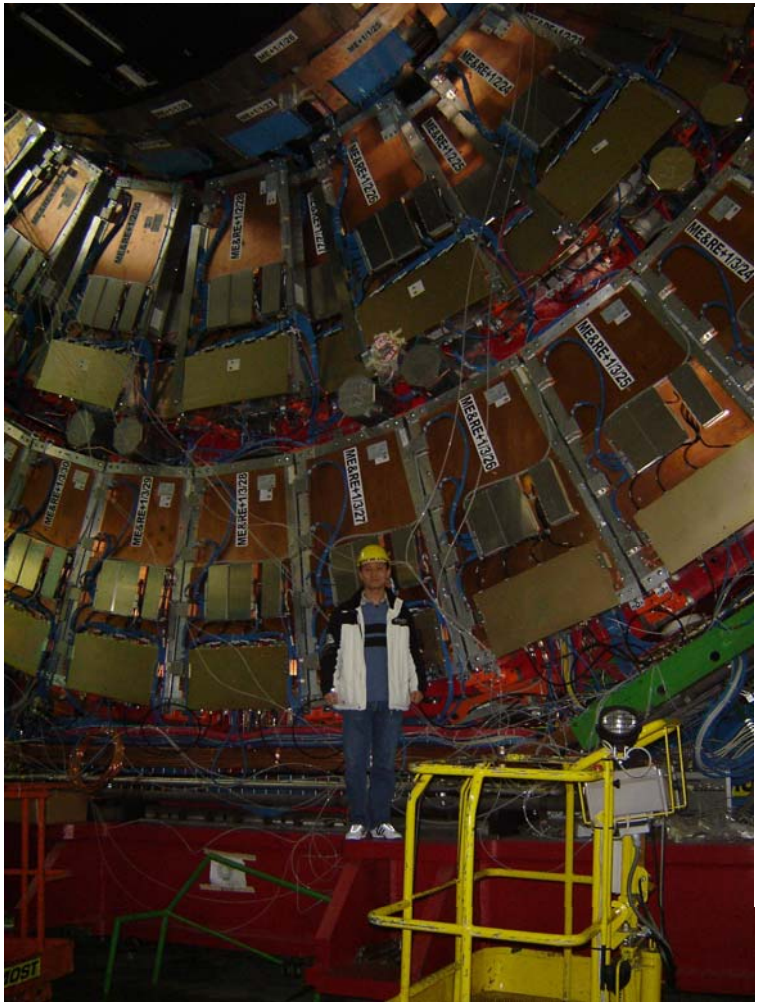
Top
Lambda_c mass
Lambda_c -> p + K0s

Bottom
Lambda_0 decay angle
Lambda+ 0 -> p+ pi-

with the clusters in Sejong University..

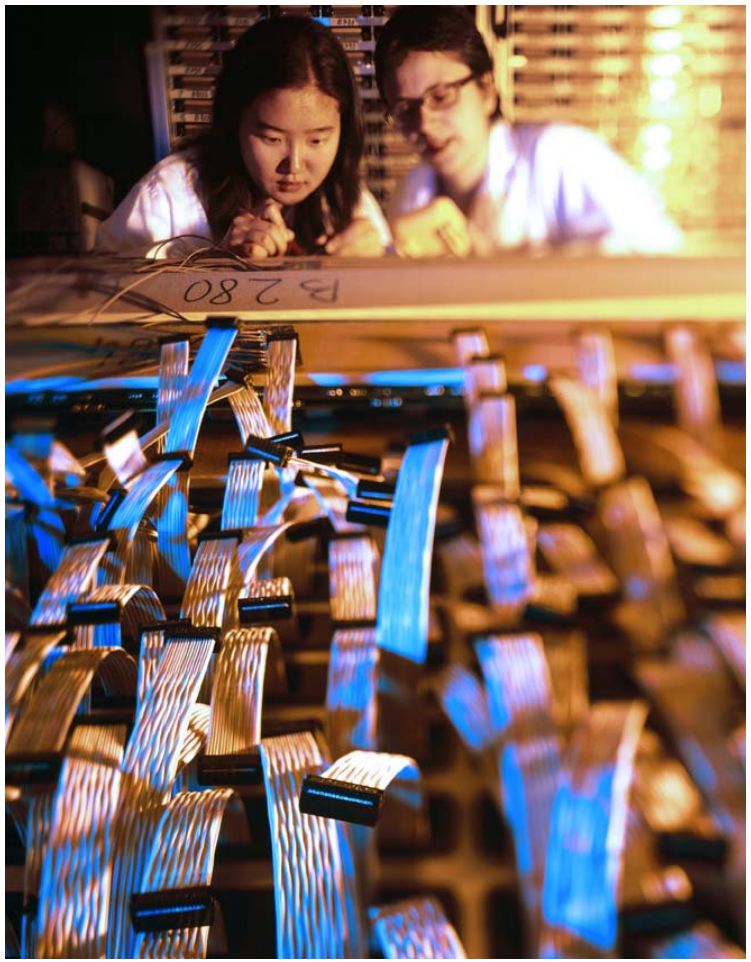
and

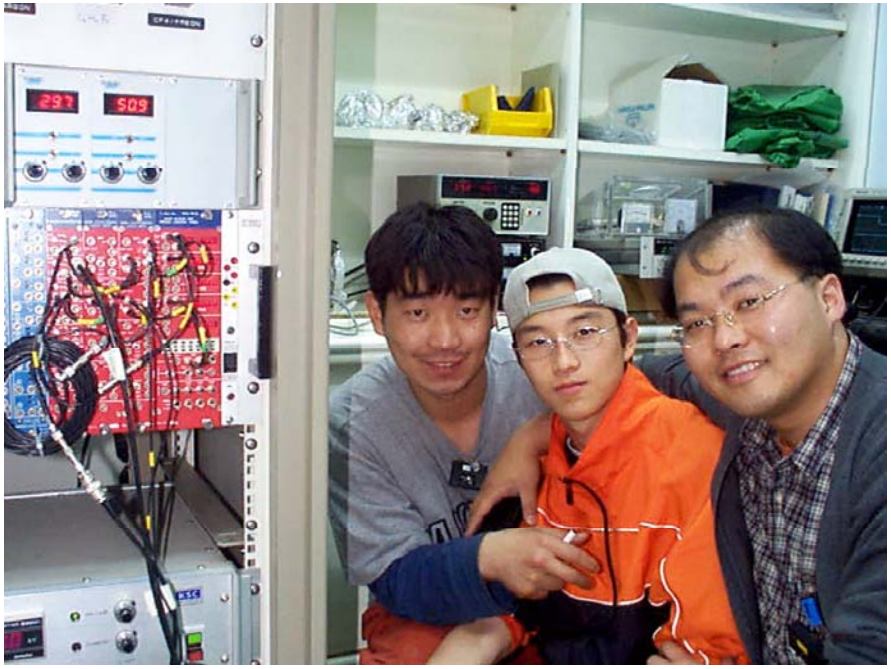
with the help of C.Y. Choi at CERN..

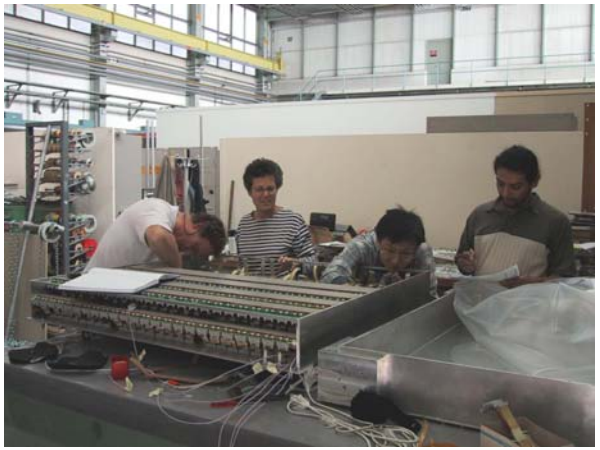


Left: Y.W. Baek installing CMS-CSC/RPC, 2006

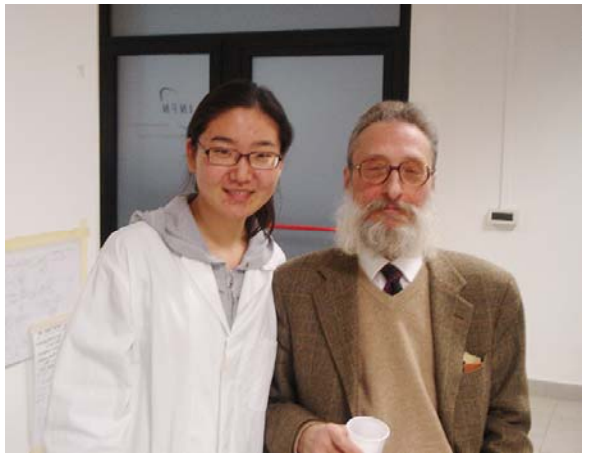
Right: J.S. Kim producing EEE chambers with the Italian high school students










ALICE-Korea budget 2007

Hope to get :
200,000,000 Korean Won (~250kCHF)

Needed :
At CERN (125kCHF)
- 50kCHF : ALICE Common fund (1/2)
- 75kCHF : 1 PhD+ 1student at CERN

In Korea (175kCHF)
- 10kCHF : Taken by Kangnung National University as Overhead
- 60kCHF : 4(/8) students in Kangnung (Salary+ Travel)
- 10kCHF : PCs and HDDs at CERN & Korea
- 10kCHF : miscellaneous expenditure at CERN & Korea
- 40kCHF : Travel to CERN for 5 PhDs in Korea
- 45kCHF : 3 students in Sejong : Will be supported by EGEE-Korea fund in 2007

→ Deficit of >50kCHF expected for 2008