



# ***IFIN-HH***

*Bucharest, 18<sup>th</sup> July, 2006*

## **“Study of Strongly Interacting Matter” (HadronPhysics)**

Integrated Infrastructure Initiatives within  
the Sixth Framework Programme (FP6) of  
the European Commission

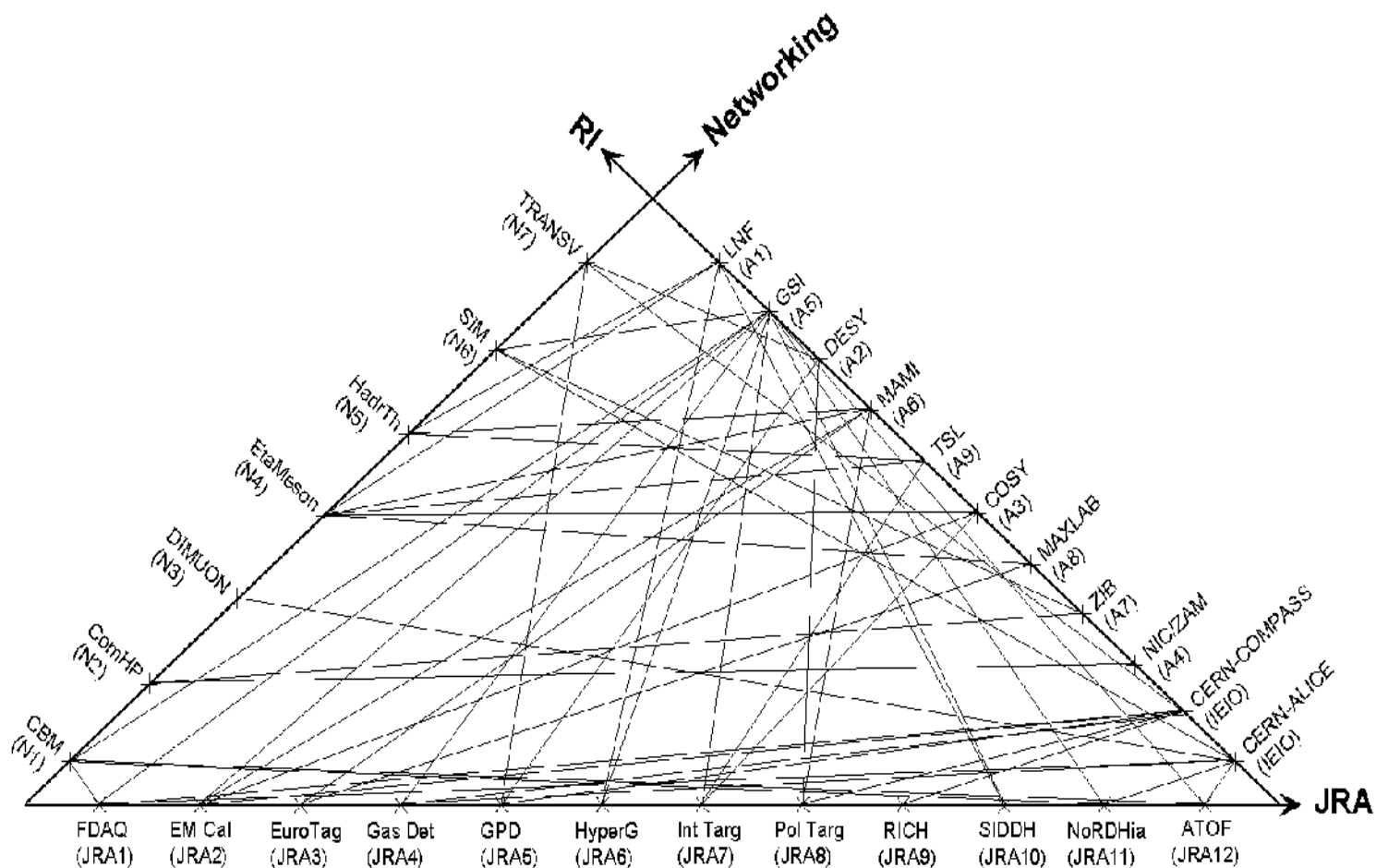
# SCIENTIFIC ACTIVITIES

*Transnational Access  
n.9 Research Infrastructures*

*Networking Activities  
n. 7*

*Joint Research Activities  
n. 12*

# Intercorrelations among activities



**TRANSNATIONAL  
ACCESS  
ACTIVITIES**

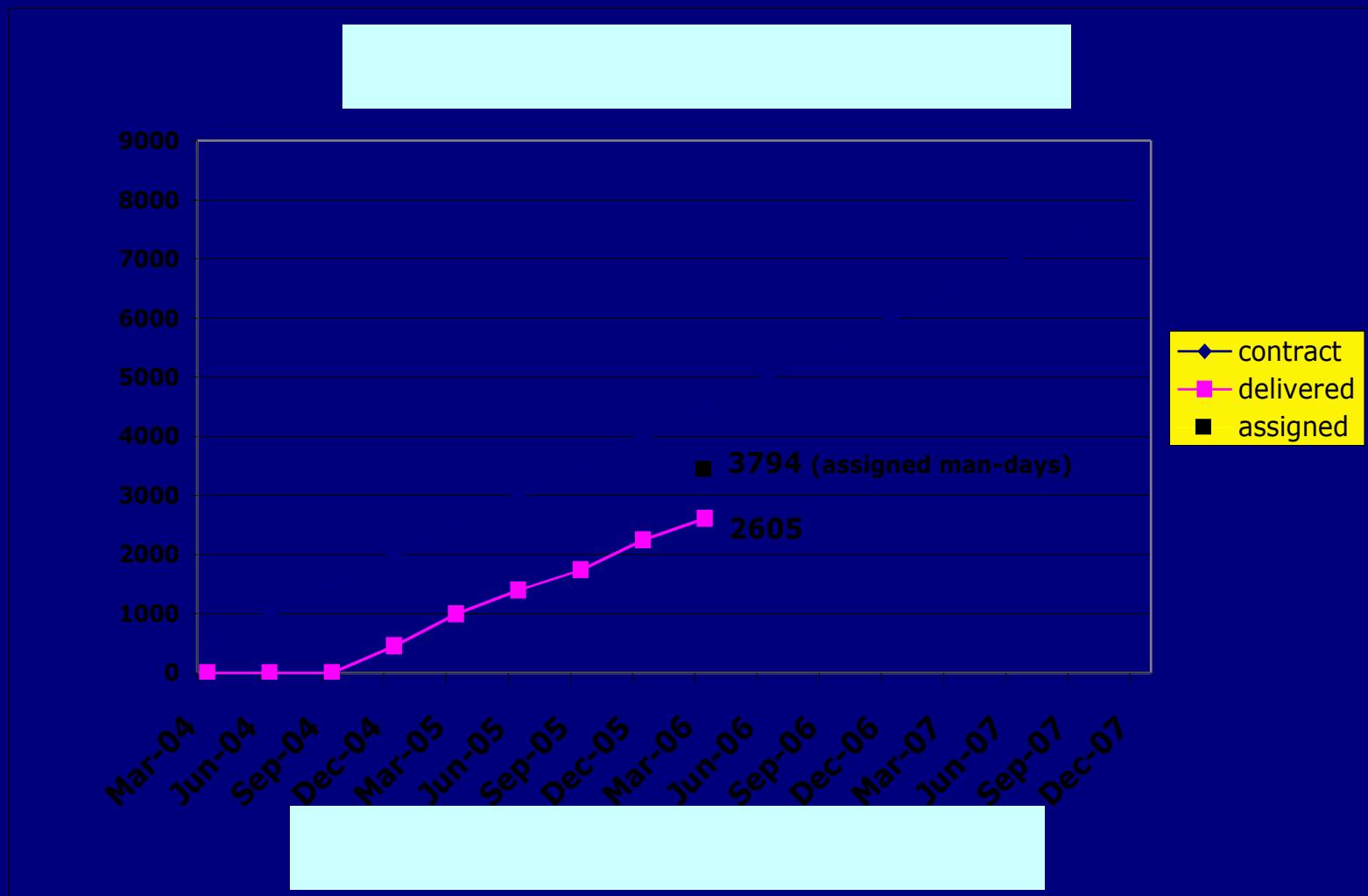
# A1: Transnational Access to INFN-LNF

**Manager: C. Guaraldo, INFN-LNF**



# A1: INFN-LNF

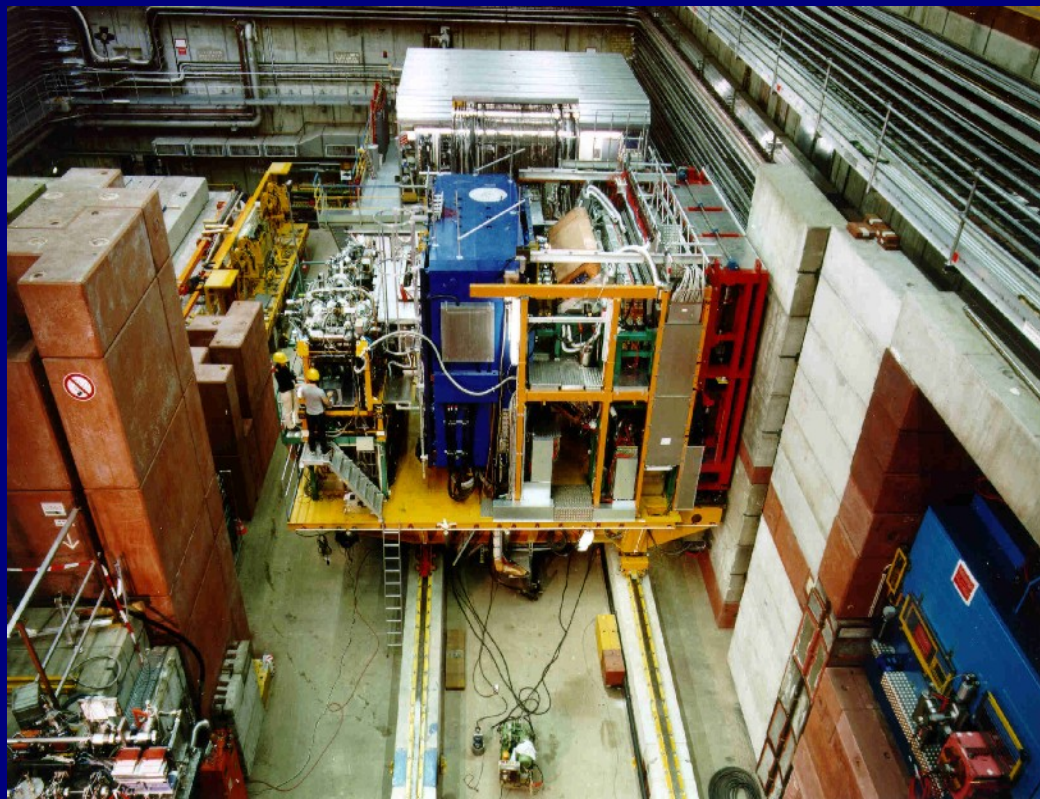
## Man-days assigned





# A2 - Transnational Access to DESY-HERMES

**Manager: E. C. Aschenauer, DESY**





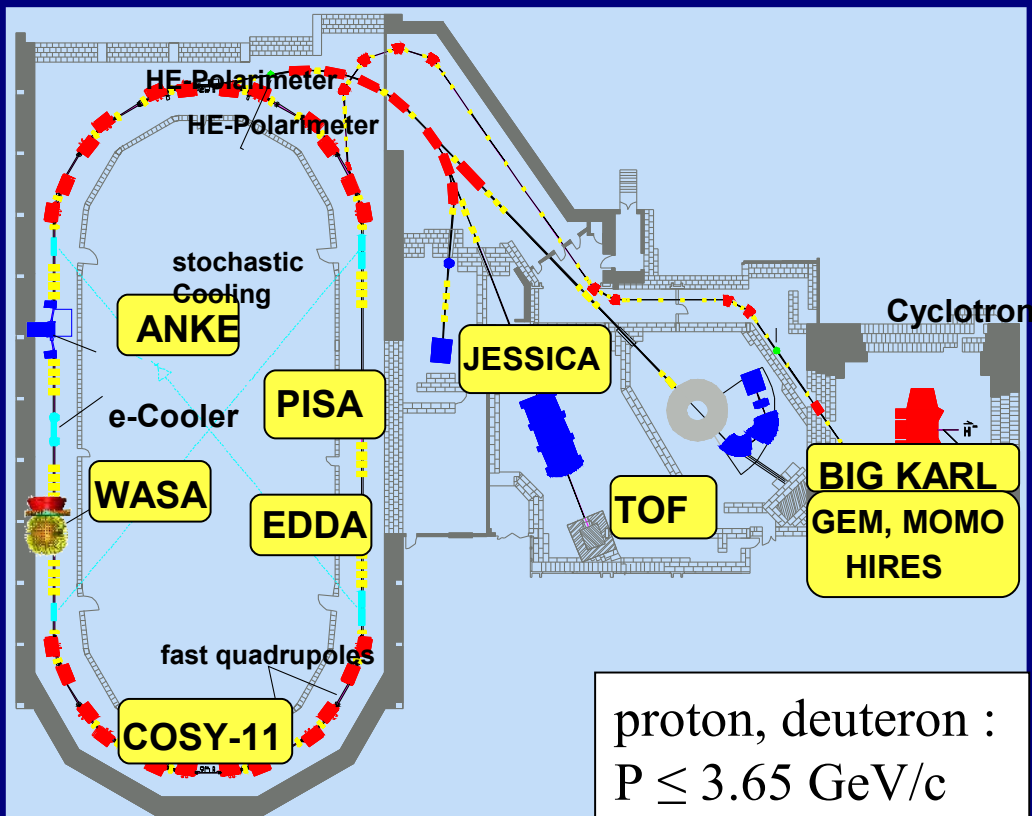
## **A2: DESY-HERMES**

**HERMES has 162 members from 26 institutes of 12 countries**

	<u><b>2004</b></u>	<u><b>2005</b></u>
<b>Supported groups:</b>	<b>6 from 5 countries</b>	<b>7 from 5 countries</b>
<b>Supported persons:</b>	<b>27</b>	<b>37/39</b>
<b>No of supported days:</b>	<b>1.484</b>	<b>1.871</b>
<b>No. of supported trips:</b>	<b>74</b>	<b>113</b>
<b>Beam on target:</b>	<b>10 months</b>	<b>10.5 months</b>

# *A3 : Transnational Access to FZJ-COSY*

Manager: D. Grzonka , DZJ

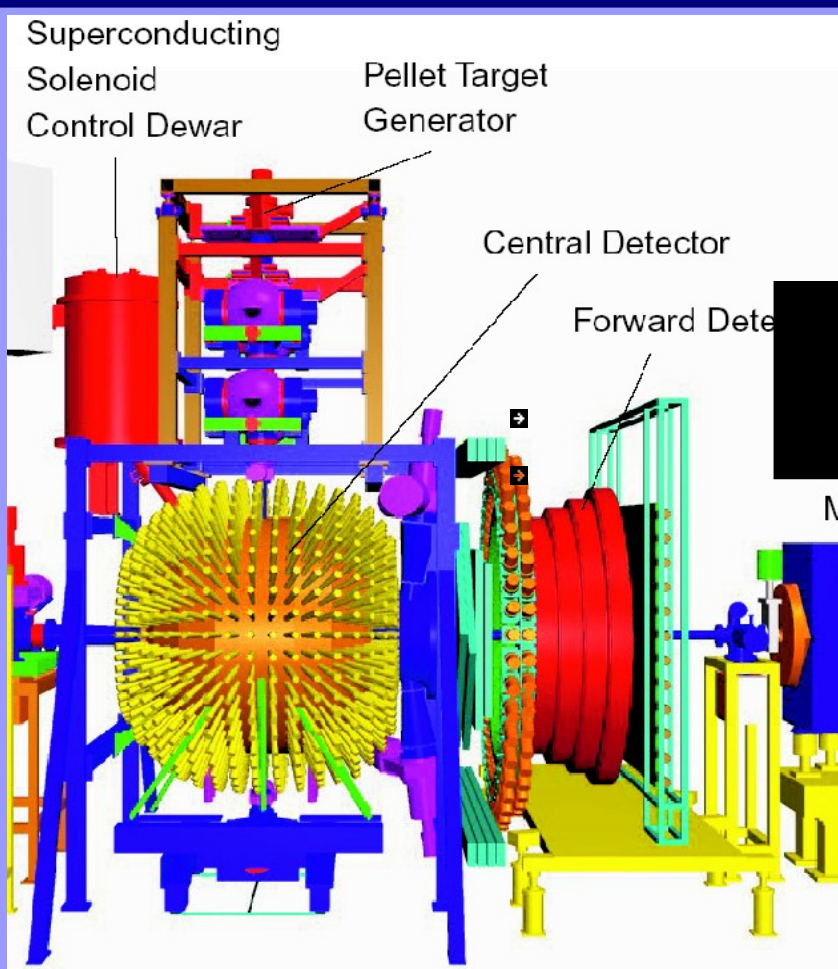


Forschungszentrum Jülich  
in der Helmholtz-Gemeinschaft

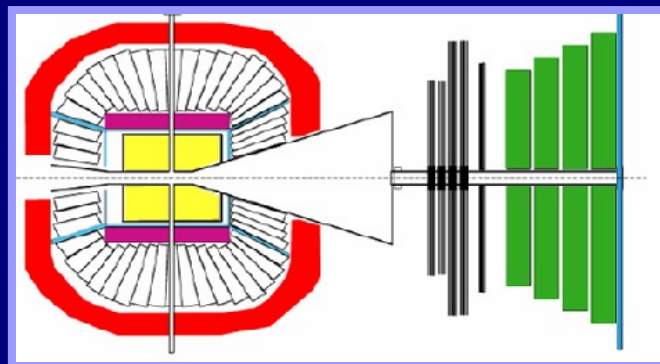


## New detector Installation: WASA at COSY

Transfer of WASA detector from Uppsala to Juelich, Installation: 2006



Carlo Guaraldo



## WASA at COSY

- **Symmetries and their violation**
  - Dynamical isospin breaking
  - Isospin violating mixing of scalar mesons
  - Decays of  $\eta$  and  $\eta'$
- **Spectroscopy**
- **Medium effects**

# A4: Transnational Access to FZJ-NIC/ZAM

**Manager: N. Attig, FZJ**



John von Neumann Institute for Computing (NIC)

Central Institute for Applied Mathematics (ZAM)

Research Centre Jülich, Germany



### NIC/ZAM center offers:

- ❑ 500,000 GFlops hours ( $\approx$  200,000 Euro)  
(funded by the EU for non-German users)  
 $\leq$  1,000,000 GFlops hours ( $\approx$  400,000 Euro)  
(funded by NIC, mainly for German users) for 4 years
- ❑ Grants for non-German users visiting NIC
  - travel: up to 400 € per trip
  - accomodation: up to 70 € per day



# A5: Transnational Access to GSI

**Manager: K-D. Gross , GSI**

## □ **year 2004**

- 2095 beam hours
- 46 travels, 442 days
- one meeting PAC/Users Selection Panel

## □ **year 2005**

- 1544 beam hours
- 69 travels, 715 days
- two meetings PAC/Users Selection Panel





# A5: GSI

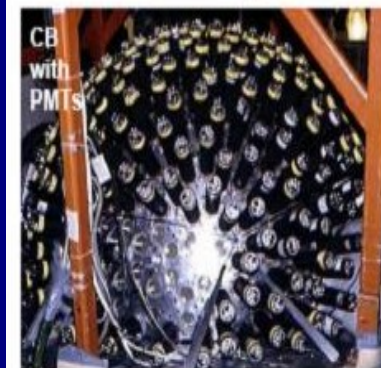
## SIS magnets





# A6: Transnational Access to MAMI

**Manager: T. Walcher , U Mainz**



**Number of supported  
Projects**

**11**

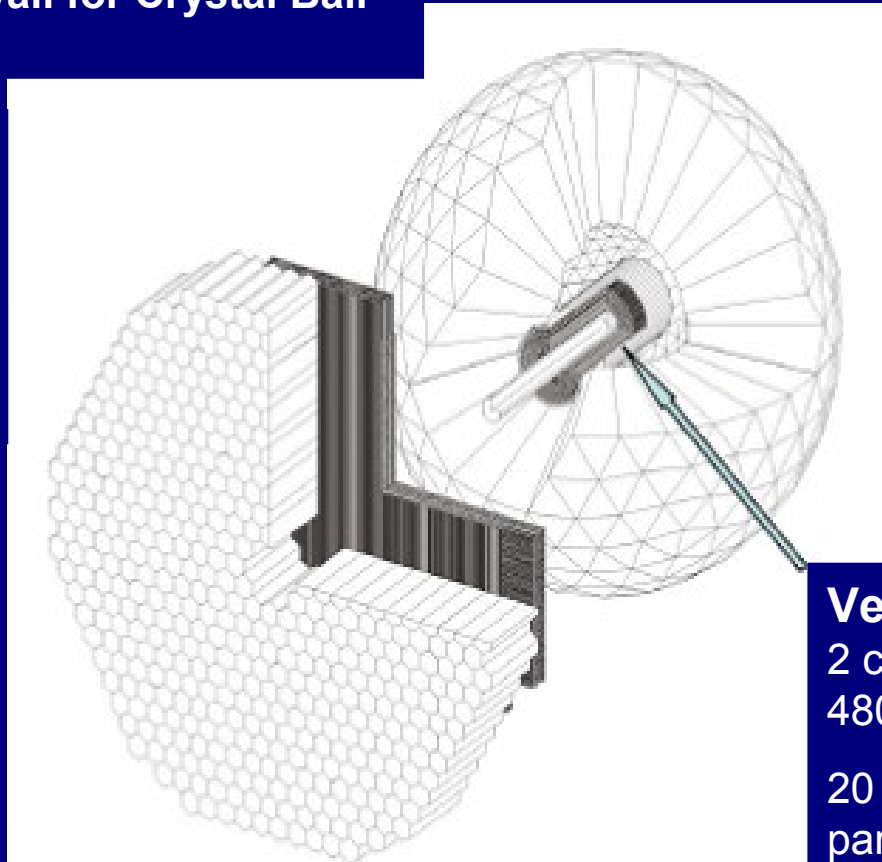
**Number of supported  
Users**

**56**

# A6: MAMI

**TAPS: (Two Arms Photon Spectrometer)**  
as forward detector wall for Crystal Ball detector

510 BaF<sub>2</sub>-detectors  
maximum kin. Energy  
 $\pi^\pm=180$  MeV  
 $K^\pm=280$  MeV  
 $p=360$  MeV



**Crystal Ball:**

672 NaI-detectors  
maximum kin. Energy  
 $\mu^\pm=233$  MeV  
 $\pi^\pm=240$  MeV  
 $K^\pm=341$  MeV  
 $p=425$  MeV

**Vertex Detectors:**

2 cylindrical wire chambers  
480 wires, 320 strips  
 20 thin plastic counters  
particle separation

**Good angular and energy resolution, close to  $4\pi$  acceptance for charged and neutral final states**

# A7: Transnational Access to ZIB

**Manager: H. Stueben , ZIB**



**Number of supported  
Projects**

**3**

**Number of supported  
Users**

**7**

## Mass storage facility at Konrad-Zuse-Zentrum Achievements in 2005

(no access in 2004)

### ■ Hardware:

- installation and operation of an access server

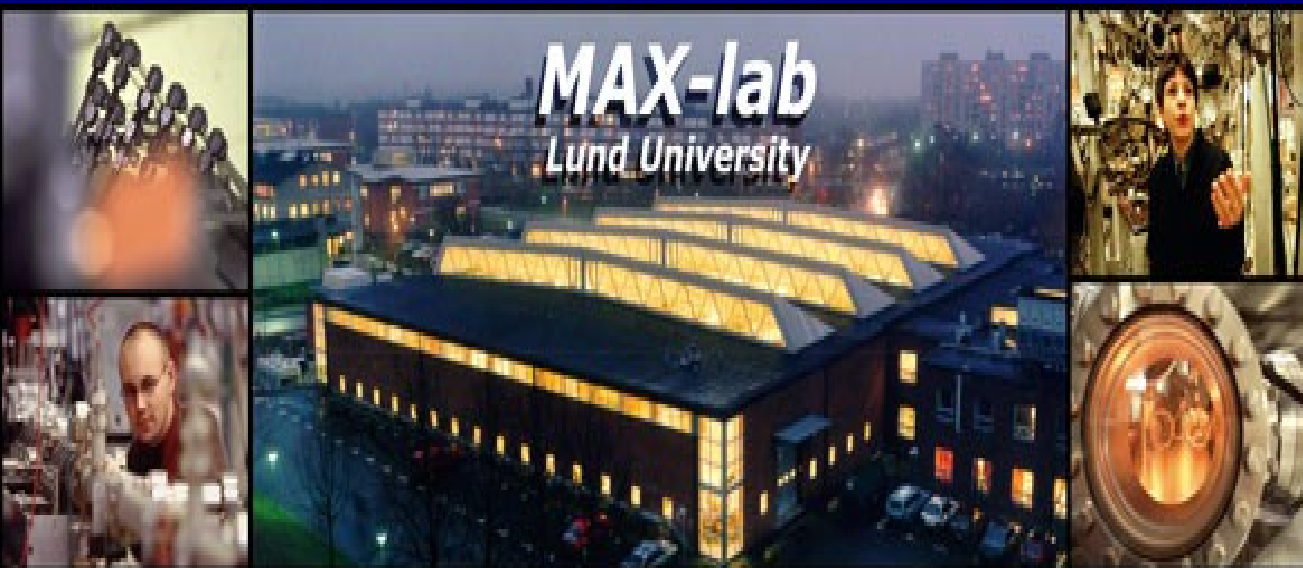
### ■ Software:

- installation and operation of the dCache software
- development of a user friendly interface "ltools"
  - tailored to the needs of the Computational Hadron Physics community
  - conforms to the standards of the "International Lattice DataGrid"
  - easy to use



# A8: Transnational Access to MAX-LAB

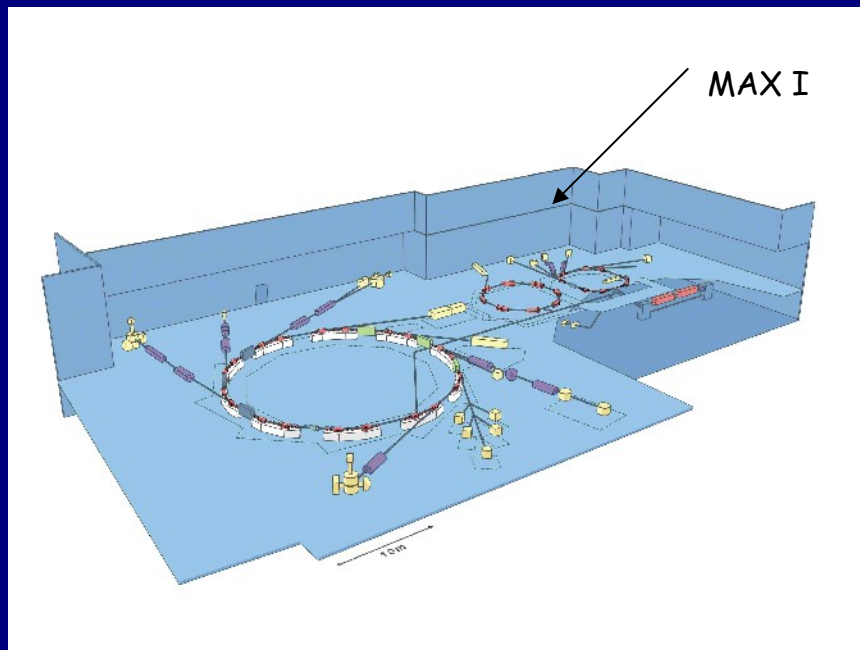
**Manager: B. Schroeder , MAX-LAB**



Number of supported Projects	Number of supported Users
5	19



# A8:MAX-LAB

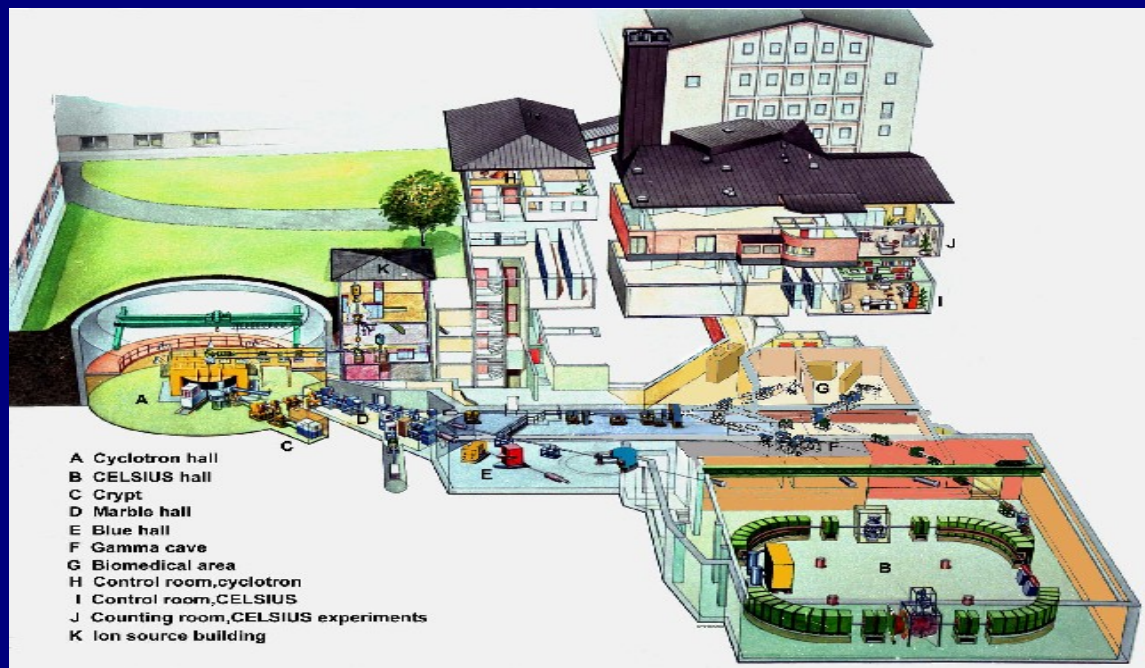


MAX-lab consists of a **linac injection system** serving **three rings MAX I, II and III**. The rings are used as **sources for synchrotron light in the VUV and soft x-ray** regimes. The **MAX I** ring is **also operated as a pulse stretcher** for the nuclear physics program.

The electrons in the ring are slowly extracted over 100 ms, the time between two adjacent injections (10 Hz operation). The figure shows the synchrotron light (intensity) from one of the bending magnets in the MAX I ring.

# A9: Transnational Access to UU-TSL

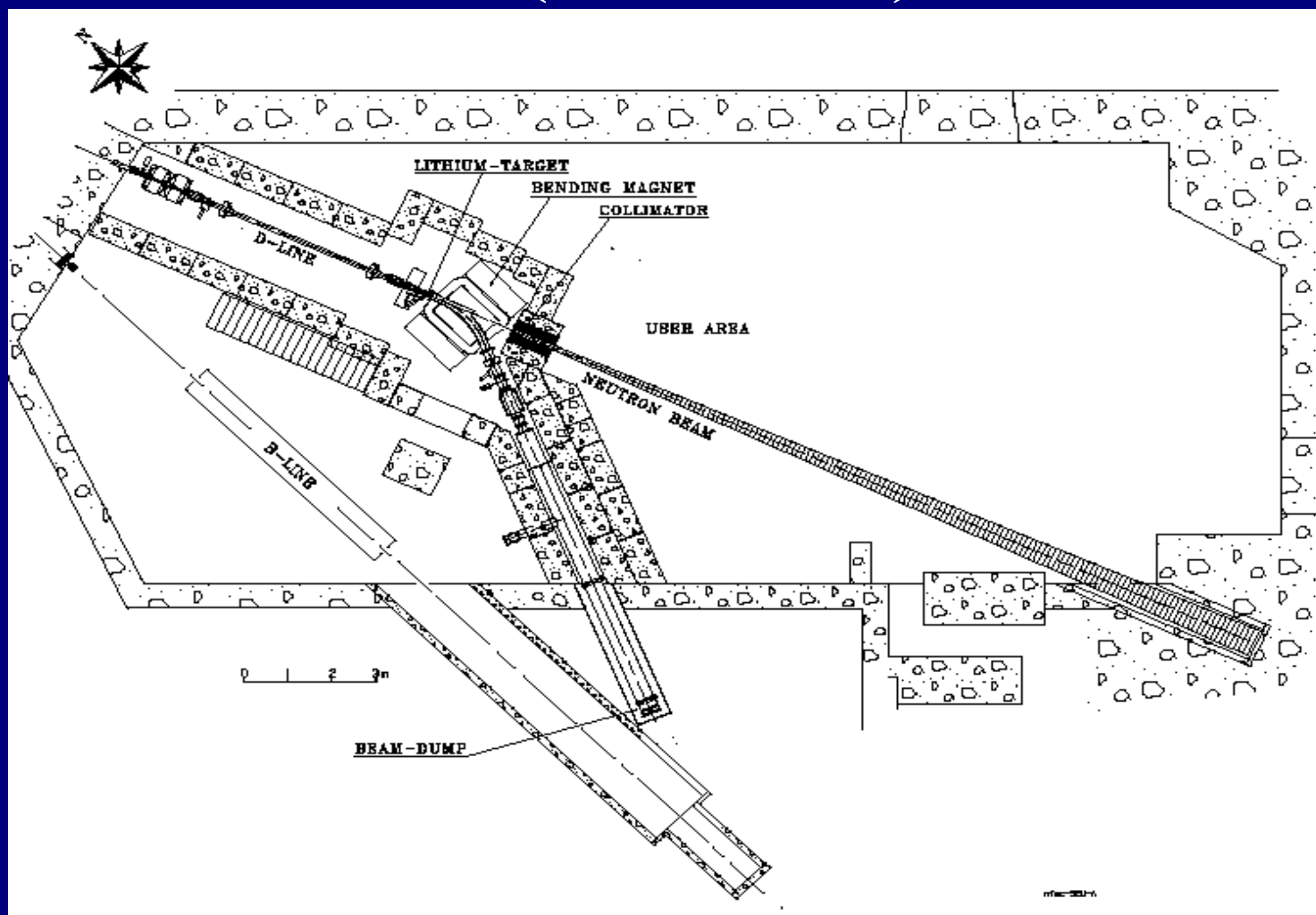
**Manager: C. Eckstrom , UU-TSL**



Number of supported Projects	Number of supported Users
7	29

# A9: UU-TSL

## The TSL neutron –beam facility (10-180 MeV)



# NETWORKING ACTIVITIES

# N1: CBMnet Compressed Baryonic Matter



❑ Constitution a formal collaboration:  
the CBM collaboration.

# **N1: *CBMnet***

## **Compressed Baryonic Matter**

### **Participants in N1**

<b>Contr. No</b>	<b>Contractor Acronym</b>	<b>Contr. No</b>	<b>Contractor Acronym</b>
<b>4</b>	<b>UCY</b>	<b>28</b>	<b>KFKI RMKI</b>
<b>14</b>	<b>GSI</b>	<b>34</b>	<b>JU</b>
<b>15</b>	<b>FZR</b>	<b>35</b>	<b>USL</b>
<b>17</b>	<b>JWGFRA</b>	<b>37</b>	<b>UWNPD</b>
<b>19</b>	<b>UHEI-PI</b>	<b>38</b>	<b>LIP</b>
<b>20</b>	<b>UMA</b>	<b>39</b>	<b>IFIN-HH</b>
<b>22</b>	<b>WWU</b>	<b>41</b>	<b>USDC</b>

**Other involved institutions: NPI, Řež , IReS, Strasbourg , Marburg University**



## Achievements 2004 and 2005

- **Submission of a Letter of Intent (Jan. 2004).**
- **Constitution of a formal CBM Collaboration (Oct. 2004).**
- **Submission of a Technical Status Report (Jan. 2005).**
- **Preparation CBM Physics Book (available beginning 2007).**

# N2: ComHP Computational (Lattice) Hadron Physics

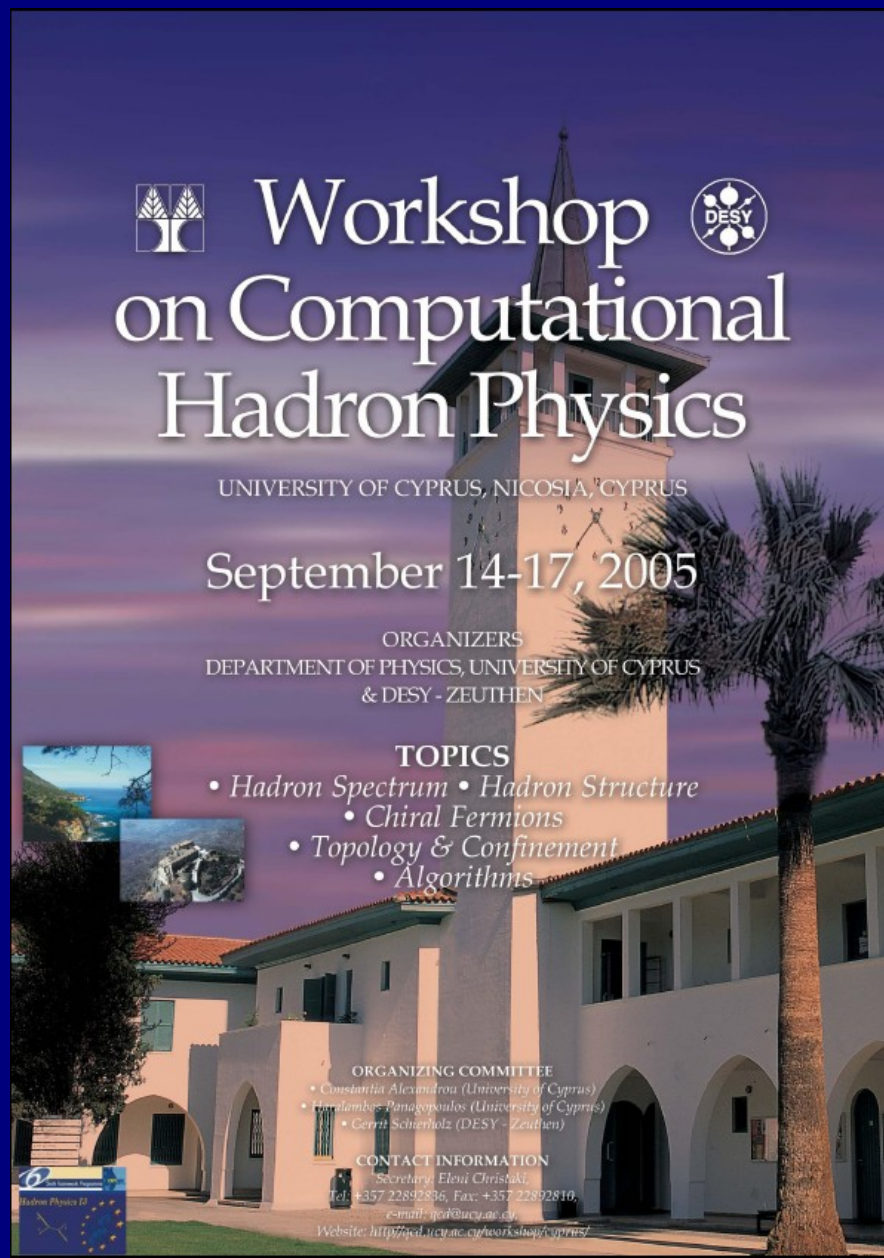
**Spokesperson: G. Schierholz , DESY**



**Deutsches Elektronen-Synchrotron**  
in der Helmholtz-Gemeinschaft



☐ Developing and exploiting advanced computational techniques to solve QCD equations.

# N2: ComHP



 **Workshop**   
on Computational  
Hadron Physics

UNIVERSITY OF CYPRUS, NICOSIA, CYPRUS

September 14-17, 2005

ORGANIZERS  
DEPARTMENT OF PHYSICS, UNIVERSITY OF CYPRUS  
& DESY - ZEUTHEN

**TOPICS**

- Hadron Spectrum • Hadron Structure
- Chiral Fermions
- Topology & Confinement
- Algorithms

**ORGANIZING COMMITTEE**

- Constantia Alexandrou (University of Cyprus)
- Giambas Panagopoulos (University of Cyprus)
- Gerrit Schierholz (DESY - Zeuthen)

**CONTACT INFORMATION**

Secretary: Elou Christaki  
Tel: +357 22892836, Fax: +357 22892810  
e-mail: [info@ucy.ac.cy](mailto:info@ucy.ac.cy)  
Website: <http://pd.uci.ac.cy/workshop/cyprus/>

**Spokesperson: E. Vercellin , INFN-TO**



- ☐ Simulation platform
- ☐ Vector meson studies
- ☐ Open beauty studies
- ☐ Open charm studies

# N3: DIMUONnet

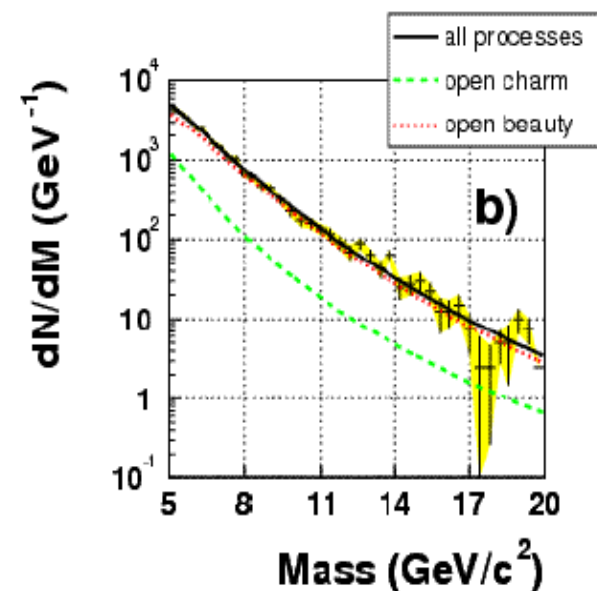
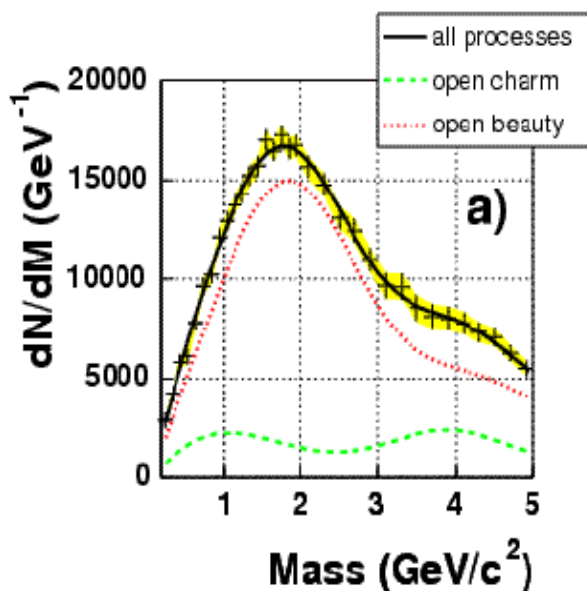
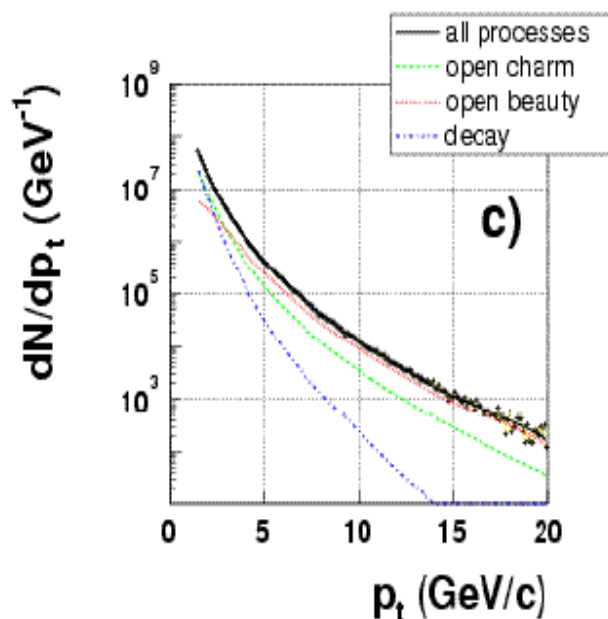
## Open beauty detection in Pb-Pb collisions

### ■ open beauty dominates:

□ Single-muon  $p_t$  distr. at large  $p_t$

□ Di-muon continuum at all masses

Open beauty signal can be extracted by fit



# N4: EtaMesonNet - Production and Decay of Mesons and Resonances

**B. Hoistad , Uppsala University**



UPPSALA  
UNIVERSITET

□ **Complementary studies on mesons especially  $\eta$ -mesons at different European accelerators**



## N4: EtaMesonNet

### Complementary techniques at:

- **CELSIUS at Uppsala**    **Detector:** **WASA (up to summer 2005)**
- **COSY at Juelich**        **Detectors:** **ANKE, COSY-11,  
WASA@COSY (from 2006)**
- **DAFNE at Frascati**    **Detector:** **KLOE**
- **MAMI at Mainz**        **Detector:** **CRYSTAL BALL**

**First EtaMesonNet Workshop,  
in Krakow, Poland,  
Sept. 16-17, 2005.**

# N5: HadronTh

## Structure and Dynamics of Hadrons

Spokesperson: Ulf-G. Meissner , Bonn University



- ☐ Radiative decays of hadrons
- ☐ Hadronic decays of B-mesons
- ☐ Baryon properties in quark models
- ☐ Spin structure of the nucleon
- ☐ Hadron dynamics in a perturbative chiral quark model
- ☐ Chiral symmetry and hadron properties
- ☐ Chiral symmetry restoration

## N5: HadronTh

**2004:** - 110 research papers published in scientific journals  
- 60 contributions to international conferences.

**2005:** - 132 research papers published in scientific journals  
- 97 contributions to international conferences.

# N6: SIM - Strongly Interacting Matter in Ultrarelativistic Heavy-Ion Collision

**Spokesperson: Joerg Aichelin , CNRS/IN2P3 - Subatech**



- ☐ pp and pA collisions at ultrarelativistic energies
- ☐ initial phase of creation of quark-gluon plasma
- ☐ time evolution and properties of quark-gluon plasma
- ☐ phase transition towards hadronic matter

## N6: SIM

**2004:** - 26 research papers published in scientific journals  
- 24 contributions to international conferences.

**2005:** - 42 research papers published in scientific journals  
- 20 contributions to international conferences.

# N7: TRANSVERSITY - Exploring the Unknown Transverse Spin Structure of the Nucleon

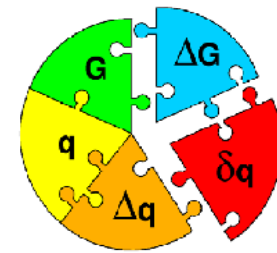
Spokesperson: E. DeSanctis, INFN-LNF



□ study of **transverse spin distributions** and **fragmentation functions** by using **polarisation and spin effects data** from **CERN-COMPASS** and **DESY-HERMES**.



# N7: activities+results by April06



## theory:

→ call for unintegrated, transverse momentum dependent **TMDs** distribution+fragmentation functions

→ proof of factorisation+universality



extremely active interplay between theory and experiment

## experiment:

→ first results from **HERMES** + **COMPASS**

→ *transversity is non-zero*

→ **TMDs** are non-zero



**JOINT  
RESEARCH  
ACTIVITIES**

# JRA1: Future DAQ

## Future Data acquisition system



- ❑ hardware and software technologies for the implementation of a new **self-triggered high-rate data acquisition system**.
- ❑ **modular solution** based on a **small number of building blocks** linked by high-speed interconnects.

# JRA2: FastEM Calorimeters Fast Compact EM Calorimeters

**Spokesperson: R. Novotny, Giessen University**



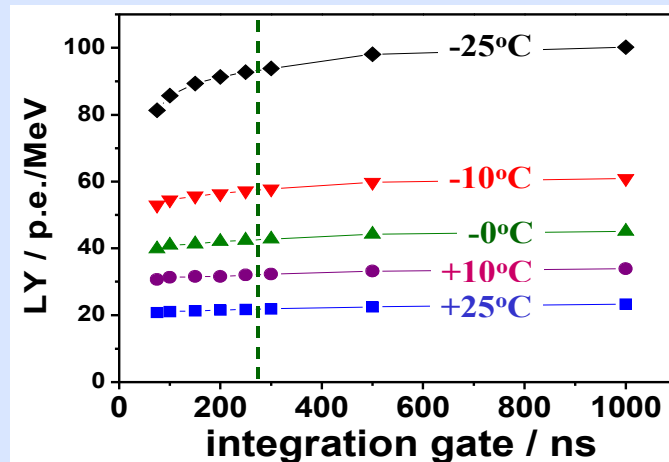
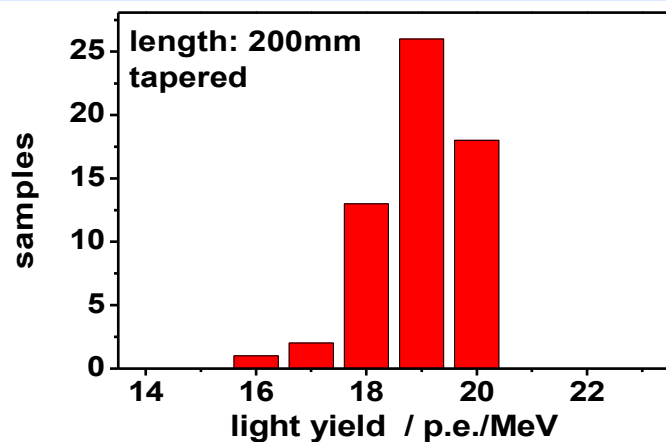
- ☐ development of next generation of PWO-II crystals
- ☐ development of new doped PbF<sub>2</sub>:X crystals
- ☐ production technology of high quality and large size LYSO:Ce crystals;
- ☐ development of fast and large size avalanche photo diodes (APD).

# JRA2: FastEM Calorimeters

- high performance  $\text{PbWO}_4$ -crystals (PWO-II) produced by BTCP, Russia



- increase of light yield ( > 100%)
- fast decay time, even at -25°C
- radiation hard
- technology ready for mass production



- high quality  $\text{PbWO}_4$  manufactured by SICCAS, China

- + extreme high light yield
- slow components
- optimization necessary for mass production



# JRA3: EuroTag European Tagged Photon Facilities

**Spokesperson: Ken Livingston, Glasgow University**



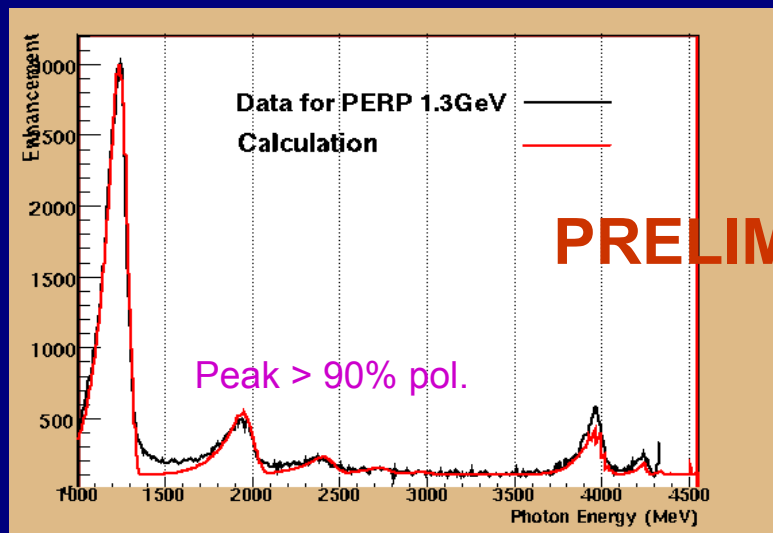
- ☐ Photon tagging
- ☐ Polarized photons

# JRA3: EuroTag

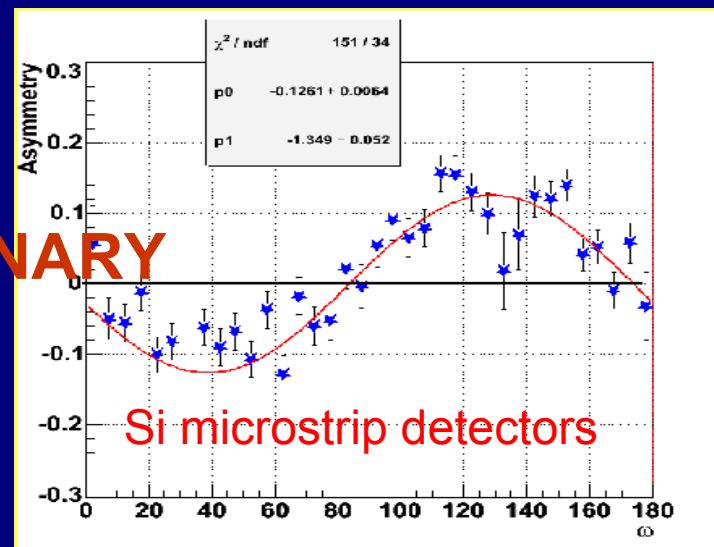
Contribution from involved Institutions:

Kharkov ( with Bonn)  
Jlab

Monte Carlo simulations.  
Recent results.



K.Livingston, Glasgow



J.Santoro, CUA

# JRA4: Gas Detectors - Development of High Speed Gas Detectors with Integrated Electronics

**Spokesperson: J. Wessels , GSI**



Westfälische  
Wilhelms-Universität  
Münster

**Development gaseous detectors with:**

- ☐ **large-area**
- ☐ **high-granularity**
- ☐ **low-mass**
- ☐ **high- speed**
- ☐ **fully integrated low-power electronics**

# **JRA4: *GasDetectors***

## **Participants in JRA4**

<b>Contr. No.</b>	<b>Contractor Acronym</b>
<b>1</b>	<b>INFN-FE</b>
	<b>INFN-LNF</b>
<b>7</b>	<b>CEA-Saclay</b>
<b>8</b>	<b>CNRS/IN2P3-SUBATECH</b>
<b>14</b>	<b>GSI</b>
<b>19</b>	<b>UHEI-PI</b>
<b>21</b>	<b>TUM</b>
<b>22</b>	<b>WWU</b>
<b>24</b>	<b>TUB</b>
<b>33</b>	<b>UiB</b>
<b>34</b>	<b>JU</b>
<b>39</b>	<b>IFIN-HH</b>

Other Involved Institutions: CERN

# JRA4: Gas Detectors

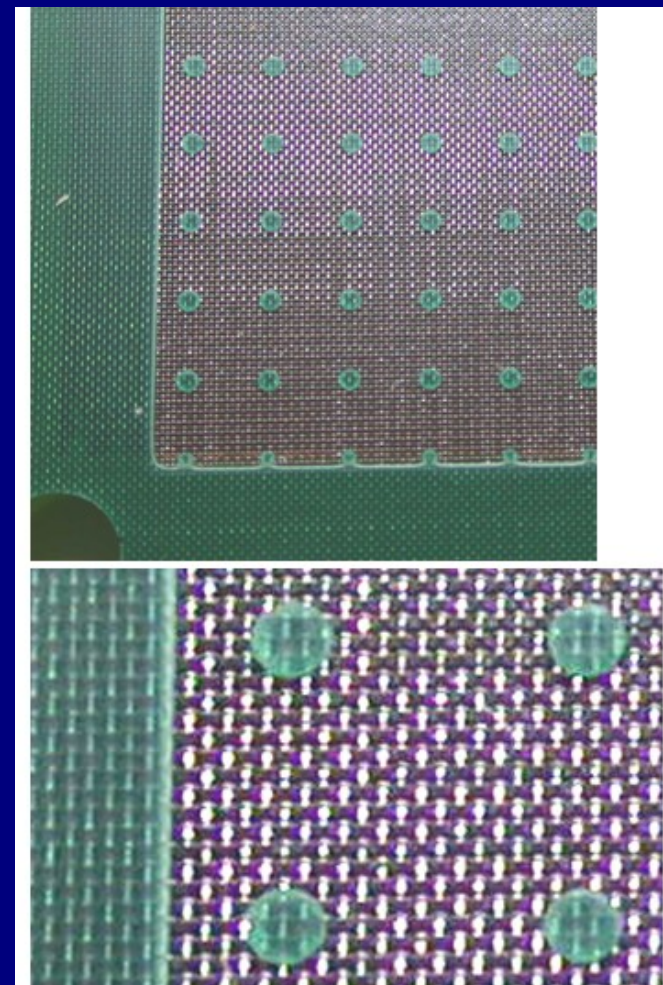
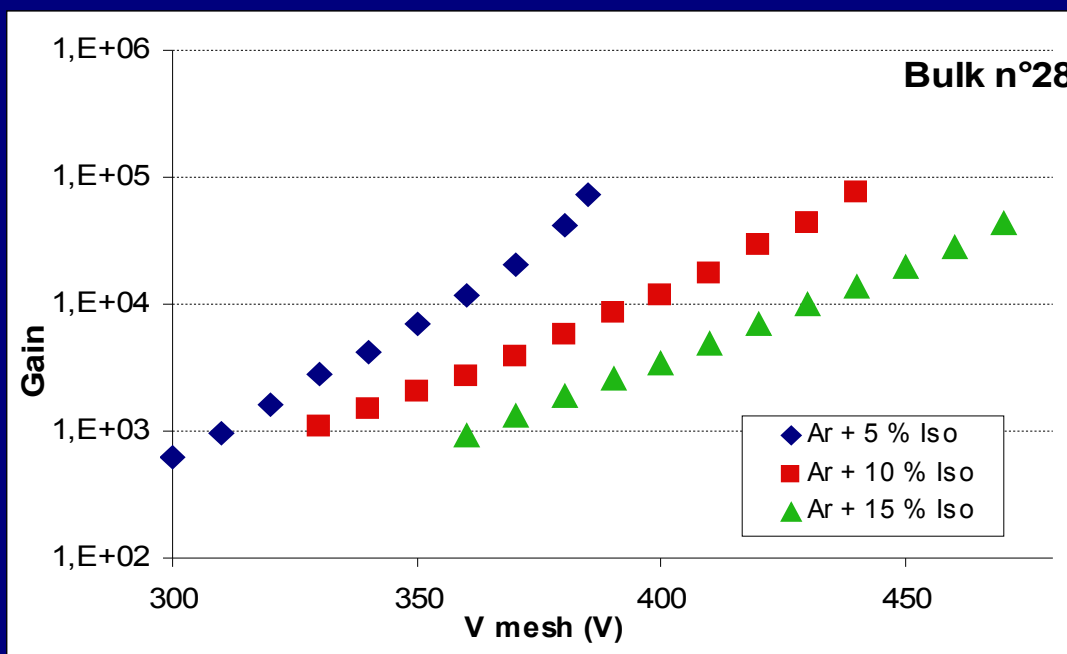
## Micromegas bulk results - gain

CEA Saclay / DAPNIA, France

Bulk comprises:

- readout PCB
- mesh
- spacers
- electrodes

10x10 cm<sup>2</sup> detector  
19 micron woven steel anode  
 $V_{\text{drift}}$  500V  
100 micron gap  
7 mm drift





# JRA5: GPD Generalised Parton Distribution

**Spokesperson: Ralf Kaiser, University of Glasgow**



- ☐ Upgrade of HERMES at DESY and COMPASS at CERN
- ☐ Transverse Target with Recoil Detector

## ■ HERMES Recoil Detector

- Constructed, assembled, tested, installed in the experiment (January 2006).
- Under commissioning.

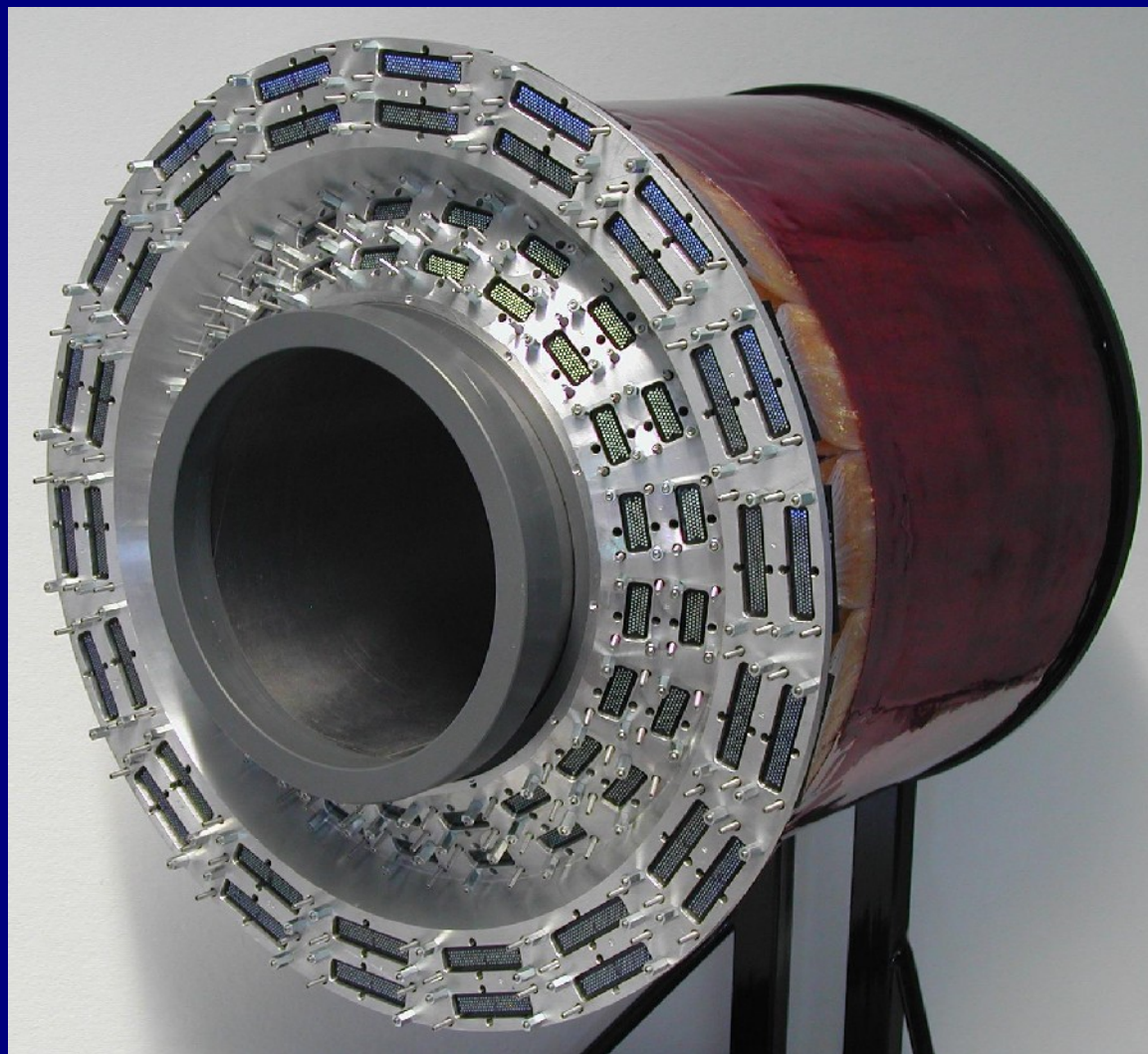
## ■ COMPASS Recoil Detector

- A method for time-of-flight measurements developed. A test bench set up in Saclay.

## ■ Transverse Target

- A test bench for small superconducting sextupole magnets set up in Ferrara and now operational.

## *HERMES Recoil Scintillating Fiber Tracker*



# JRA6: Hyper Gamma - High Luminosity Hypernuclear Gamma-Spectroscopy

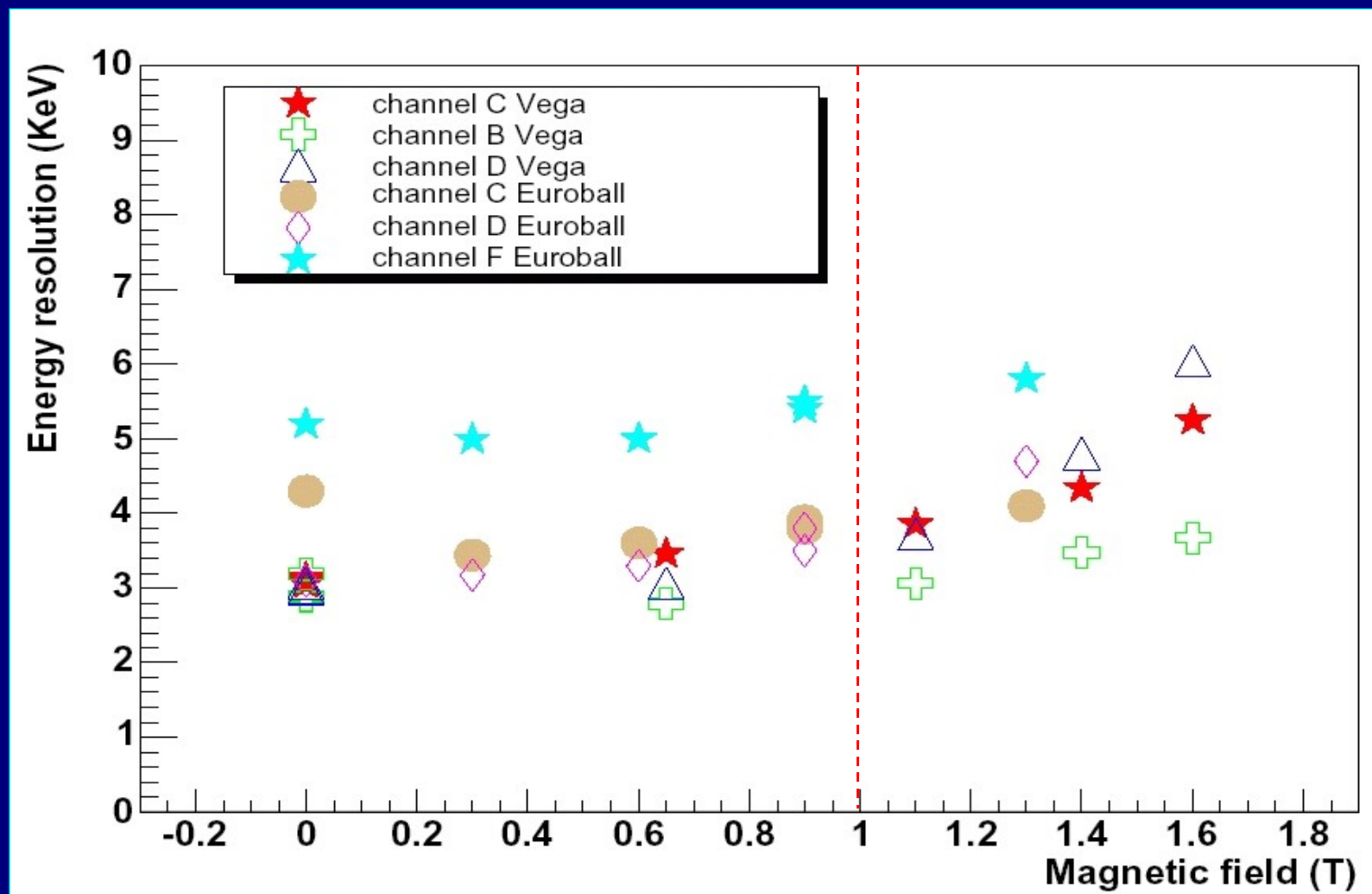
**Spokesperson: A. Feliciello, INFN-TO**



- ❑ HPGe crystals behaviour in (strong) magnetic field
- ❑ Energy resolution dependence on magnetic field

# JRA6: Hyper Gamma

## Energy resolution in magnetic field





# JRA7: Internal Targets - High Luminosity Internal Targets for Storage Rings

**Spokesperson: H. Orth , GSI**



- ☐ pellet target
- ☐ cluster-jet target
- ☐ superfluid helium target

# JRA7: Internal Targets

## **Pellet Target**

- The Svedberg Laboratory, Uppsala
- Dept. of Radiation Sciences, Uppsala
- Forschungszentrum Jülich

## **Cluster Target**

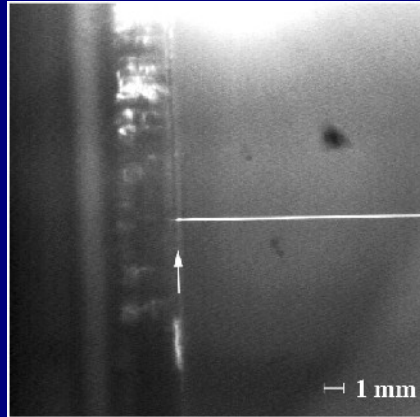
- IKP, Univ.Münster
- GSI, Darmstadt
- INFN-Genova
- SMI-ÖAW, Vienna

## **Superfluid Helium Target**

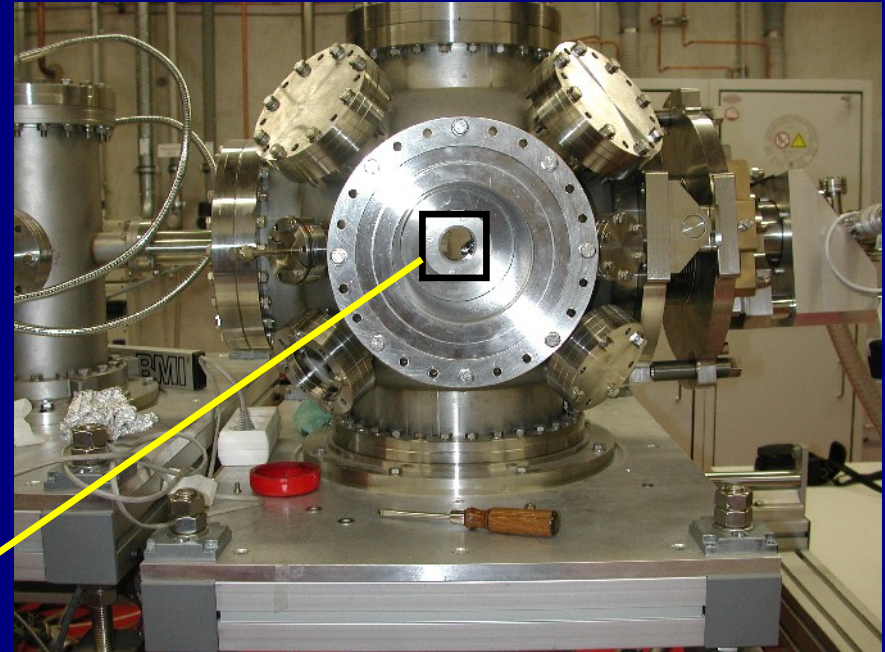
- IKP, Univ.Frankfurt

# JRA7: Internal Targets

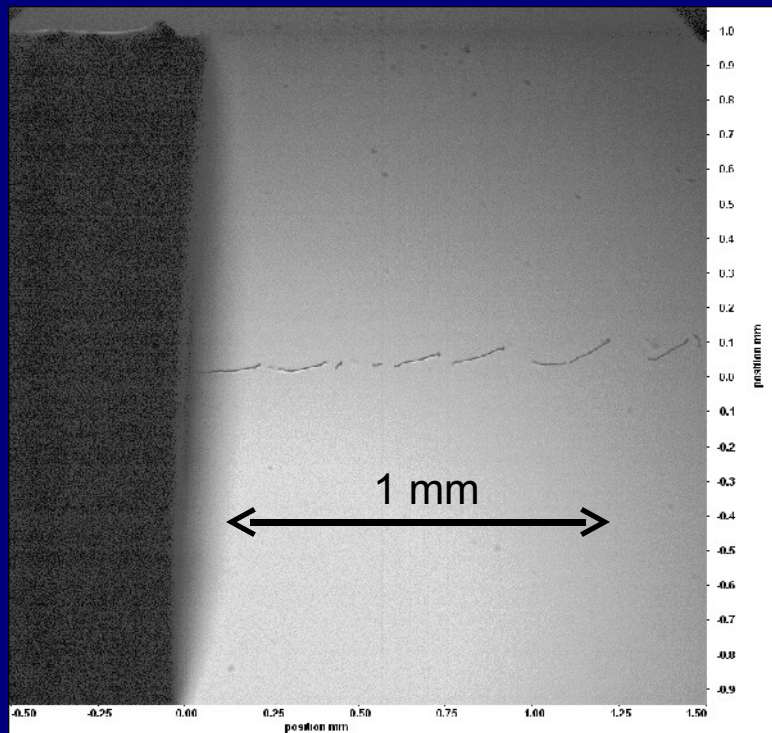
## Frankfurt - Superfluid Helium and Hydrogen microjets



A superfluid He microjet has recently been demonstrated. The measured angular spread is  $\approx 1$  mm at 1 m downstream from the nozzle



Hydrogen microjet generation has been investigated by means of shadow imaging (time res.  $< 20$  ns). The production of small (2 mm) filaments could directly be observed. Vibrations cause the initial filament to break into a sequence of rods, giving rise to a quite broad ( $\approx 2^\circ$ ) angular divergence.



# JRA8: Polarized Targets

## Polarized Nucleon Targets for Europe

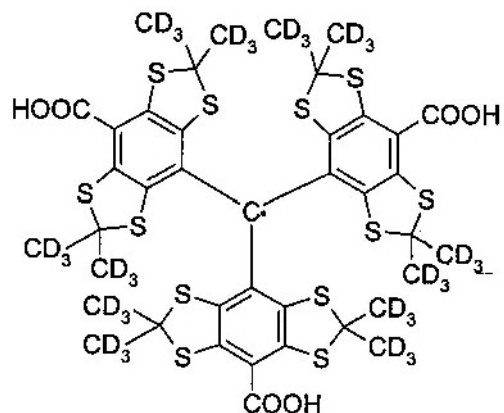
**Spokesperson: W. Meyer , Bochum University**



- ❑ High field ESR-spectroscopy
- ❑ Highest deuteron polarization
- ❑ Beta irradiation of purified HD

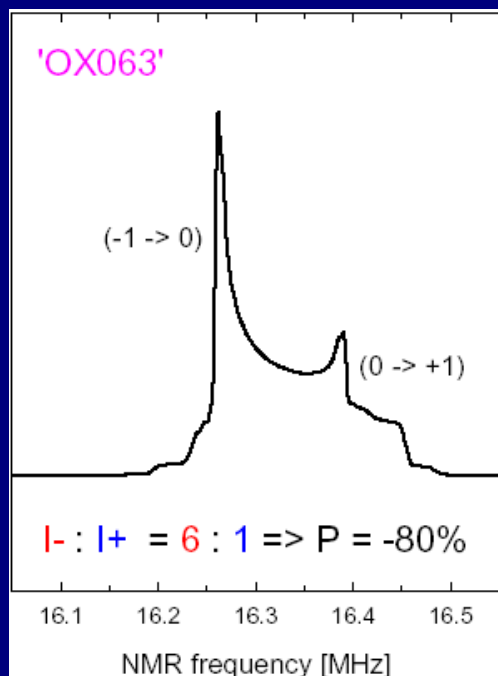
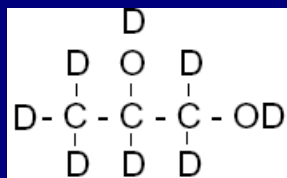
# JRA8: Polarized Targets

## *Highest deuteron polarization*

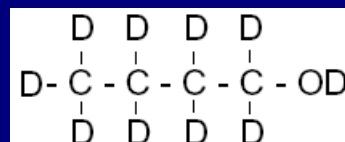


With the new chemical dopant, the trityl radical Finland D36, the highest ever seen deuteron polarization could be achieved → more than 80%

D-Propanediol :



D-Butanol :



# JRA9: RICH Detectors - Ring Imaging Cherenkov counters for particle identification

**Spokesperson: S. Dalla Torre , INFN-TS**



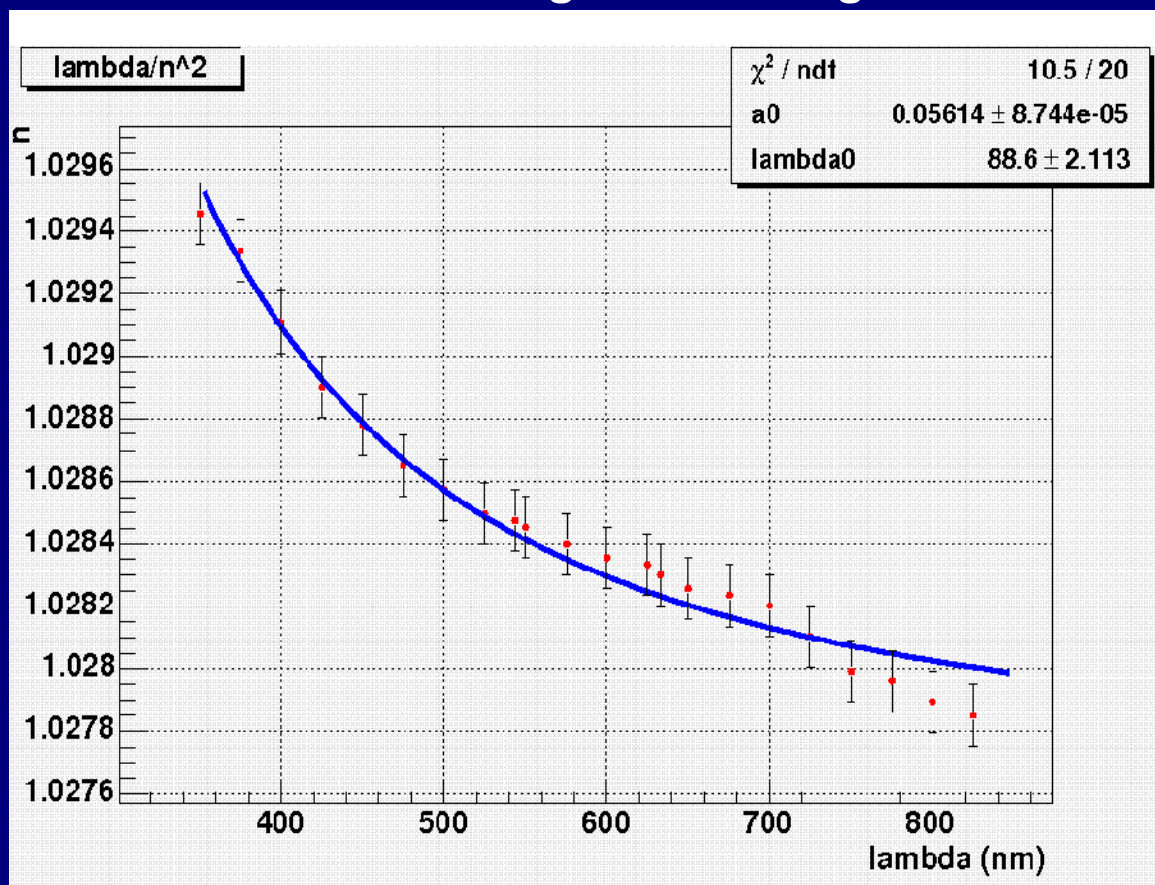
- ☐ **Fast RICH technology for high momentum hadron PID (up to above 100 GeV/c).**
- ☐ **Study of AEROGEL radiators with PID capabilities up to a few 10 GeV/c.**



# JRA9: RICH Detectors

## HIGHLIGHTS : AEROGEL

Aerogel characterization:  
refractive index vs light wave length



# JRA10: SIDDHARTA - Silicon Drift Detectors for X-ray spectroscopy

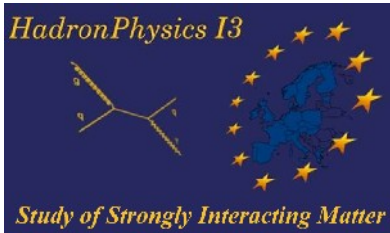
**Spokesperson: V. Lucherini, INFN-LNF**



- ❑ Soft X-ray detection apparatus based on large area Silicon Drift Detectors (SDD)
- ❑ high energy resolution and high background rejection by triggered application in the energy range (100 eV, 15 keV) for exotic atoms research



**PN**Sensor



*LNF- INFN, Frascati, Italy*  
*Politecnico, Milano, Italy*  
*MPE, Garching, Germany*  
*PNSensors, Munich, Germany*  
*Stefan Meyer Inst., Vienna, Austria*  
*IFIN – HH, Bucharest, Romania*

# JRA10 - SIDDHARTA: 2004-2005

Silicon Drift Detector for Hadronic Atom Research by Timing Applications

**Goal:** design and production of large area Silicon Drift Detector (SDD)(1cm<sup>2</sup>) with good energy resolution (140 eV of FWHM at 6 keV) and high background rejection capability by triggered (1  $\mu$ s) application, for precision (few eV) X-ray exotic atoms transition research

# JRA11: NoRHDia - Novel Radiation Hard CVD - Diamond Detectors

**Spokesperson: E. Berdermann, GSI**



☐ **Development of Single Crystal Diamond detectors**

## **Participants in JRA11**

<b>Contr. No</b>	<b>Contractor Acronym</b>
<b>1</b>	<b>INFN-MI</b>
<b>3</b>	<b>LUC</b>
<b>7</b>	<b>CEA-Saclay</b>
<b>9</b>	<b>DESY-Zeuthen</b>
<b>14</b>	<b>GSI</b>
<b>21</b>	<b>TUM</b>
<b>39</b>	<b>IFIN-HH</b>

Other Involved Institutions: CERN; Karlsruhe University; IJS, Ljubljana; VERA Laboratory, Vienna; Wits University, Johannesburg

- **Single-crystal diamond growth**
  - First promising high purity samples are produced and characterized in Saclay.



# JRA12: ATOF

## Advanced TOF detection systems

**Spokesperson: N. Hermann, GSI**



### Resistive Plate Chambers (RPCs):

- ☐ high count rate capability (up to 50 kHz)
- ☐ coverage of a large area ( $\geq 120 \text{ m}^2$ ) with an affordable number of readout channels
- ☐ associated front-end and digitization electronics

# **JRA12: *ATOF***

## **Participants in JRA12**

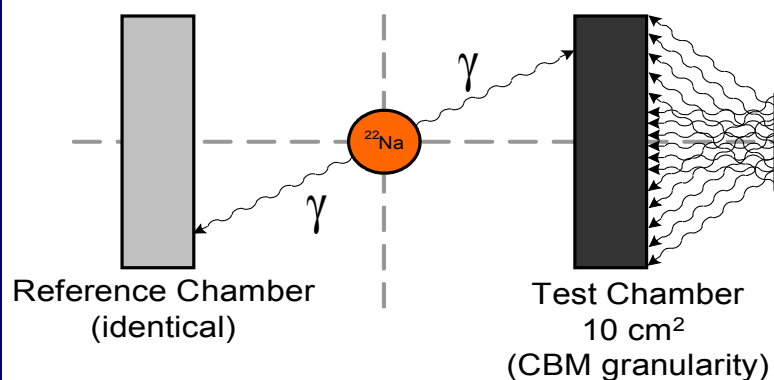
<b>Contr. No.</b>	<b>Contractor Acronym</b>
<b>14</b>	<b>GSI</b>
<b>15</b>	<b>FZR</b>
<b>19</b>	<b>UHEI-PI</b>
<b>34</b>	<b>JU</b>
<b>38</b>	<b>LIP-Coimbra</b>
<b>39</b>	<b>IFIN-HH</b>
<b>41</b>	<b>USDC</b>

## RPC rate capability

### Rate / ceramics (NEW)

- Commercial “controlled resistivity” alumina, **AI940CD**, from Wesgo® Ceramics
- Volume resistivity between  $1 \times 10^9$  and  $2 \times 10^9 \Omega \cdot \text{cm}$  at room temperature.
- Seems to be electronic conductor (no charge-up effects).
- Good (hard, dense) surface.
- Not straightforward ( $\sim 1$  year R&D)

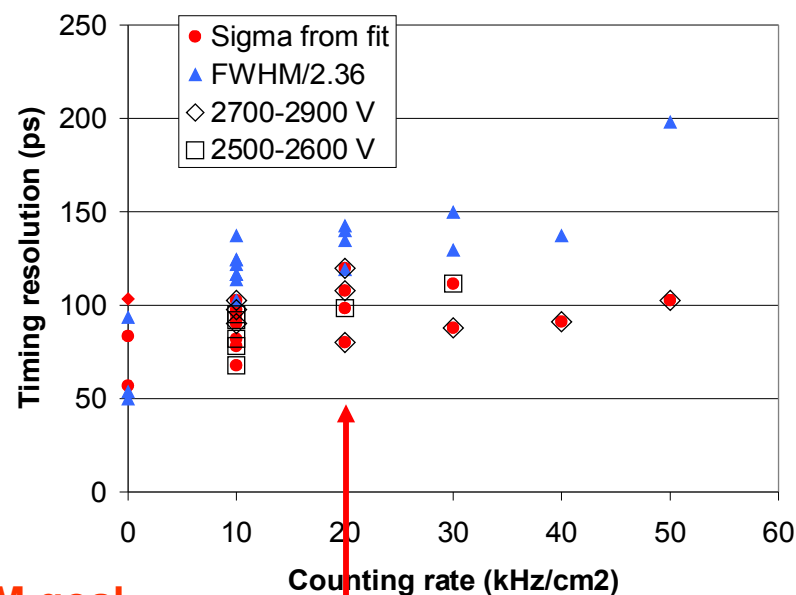
### Benchtop test setup



**No significant degradation observed with increasing rate up to 50 kHz/cm<sup>2</sup>**

**Test done with single cell RPC.  
Multigap RPC with same material:  
⇒  $\sigma_t < 60\text{ps}$  anticipated**

P. Fonte, L.Lopes (Coimbra)



**CBM goal**  
**well in reach**

# FINANCIAL ISSUES

# Community financial contribution

- The **maximum *Community* contribution** to the *project* shall be **EUR 17.400.000** (seventeen million four hundred thousand euro).

# **Distribution of the EC financial contribution *per country (1)***

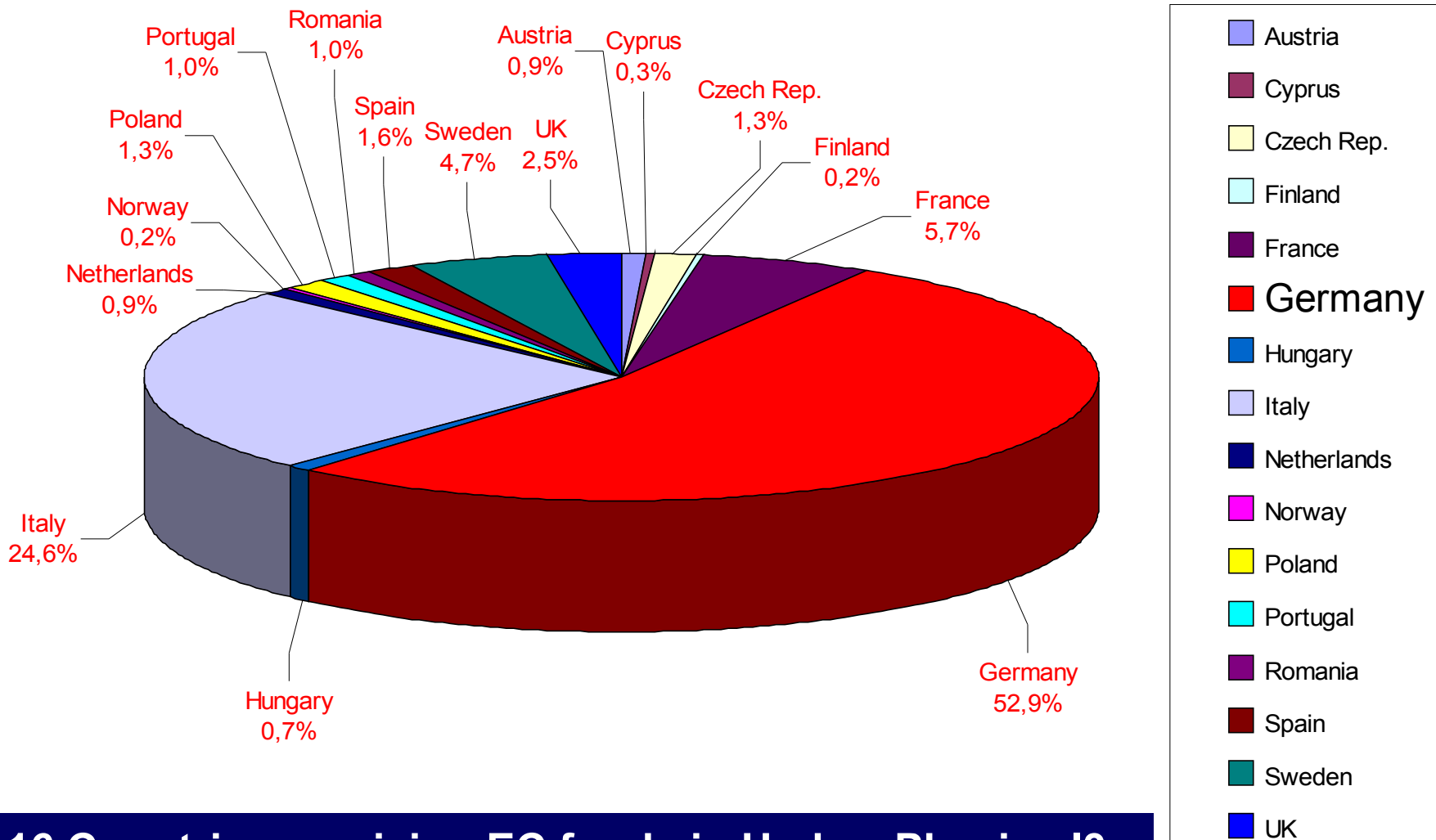
<b>Country</b>	<b>EC contribution (€)</b>
<b>Germany</b>	<b>9.212.568,00</b>
<b>Italy</b>	<b>4.273.950,00</b>
<b>France</b>	<b>998.432,00</b>
<b>Sweden</b>	<b>825.000,00</b>
<b>UK</b>	<b>427.300,00</b>
<b>Spain</b>	<b>283.750,00</b>
<b>Czech Rep.</b>	<b>225.000,00</b>
<b>Poland</b>	<b>224.800,00</b>
<b>Portugal</b>	<b>181.000,00</b>



# **Distribution of the EC financial contribution *per country (2)***

<b>Country</b>	<b>EC contribution (€)</b>
<b>Romania</b>	<b>171.000,00</b>
<b>Austria</b>	<b>165.000,00</b>
<b>Netherlands</b>	<b>164.000,00</b>
<b>Hungary</b>	<b>117.000,00</b>
<b>Cyprus</b>	<b>51.200,00</b>
<b>Finland</b>	<b>40.000,00</b>
<b>Norway</b>	<b>40.000,00</b>
<b>TOTAL</b>	<b>17.400.000,00</b>

# Distribution of the EC financial contribution *per country*



# **Distribution of EC financial contribution *per Institutions (1)***

**70 Institutions receiving EC funds in *HadronPhysics* I3 Project**

<b>Institutions</b>	<b>Acronym</b>	<b>EC contribution (€)</b>
<b>INFN, Frascati</b>	<b>INFN-LNF</b>	<b>2.741.950,00</b>
<b>Gesellschaft für Schwerionenforschung mbH</b>	<b>GSI</b>	<b>1.892.167,00</b>
<b>Ruhr-University Bochum</b>	<b>RUB</b>	<b>801.901,00</b>
<b>DESY, Zeuthen</b>	<b>DESY-Zeuthen</b>	<b>726.000,00</b>
<b>University of Mainz</b>	<b>U Mainz</b>	<b>694.000,00</b>
<b>University of Mainz MAMly</b>	<b>MAMI</b>	<b>686.000,00</b>

# **Distribution of EC financial contribution *per Institutions (2)***

**70 Institutions receiving EC funds in *HadronPhysics* I3 Project**

<b>Institutions</b>	<b>Acronym</b>	<b>EC contribution (€)</b>
<b>Justus - Liebig - Universität</b>	<b>JLU-PIG</b>	<b>604.200,00</b>
<b>INFN, Torino</b>	<b>INFN-TO</b>	<b>445.000,00</b>
<b>Rheinische Friedrich-Wilhelms-Universität</b>	<b>U Bonn</b>	<b>435.000,00</b>
<b>Ruprecht-Karls-Universität Heidelberg</b>	<b>UHEI-PI</b>	<b>429.200,00</b>
<b>DAPNIA, CEA/Saclay</b>	<b>CEA-Saclay</b>	<b>383.500,00</b>
<b>CNRS/IN2P3, SUBATECH, Nantes</b>	<b>CNRS/IN2P3- SUBATECH</b>	<b>358.500,00</b>

# **Other Involved Institutions (1)**

**68 Institutions which have a specific role in the activities,  
but do not receive EC funds**

**Graz University; VERA Laboratory, Vienna; Gent University ;  
Limburgs University Centrum, Diepenbeek; Sofia University; CTU,  
Prague ; ISI, Brno; NPI, Rez; TUL, Liberec; ESRF, Grenoble; IReS,  
Strasbourg; LAPTH, Annecy; LPT, Orsay; Tbilisi University;  
Augsburg University; IKEP, Karlsruhe; Korth Kristalle GmbH, Kiel;  
KIP, Heidelberg; Karlsruhe University; Leipzig University; Marburg  
University; PNSensor, Munich; Hamburg University; IASA, Athens;  
Tel Aviv University; INFN, Florence; INFN, Lecce; INFN, Napoli; INFN,  
Perugia; INFN, Pisa; INFN, Rome 1; INFN, Rome 3; AIST, Tsukuba;  
IPJ, Lodz ; Wroclaw University;**

## **Other Involved Institutions (2)**

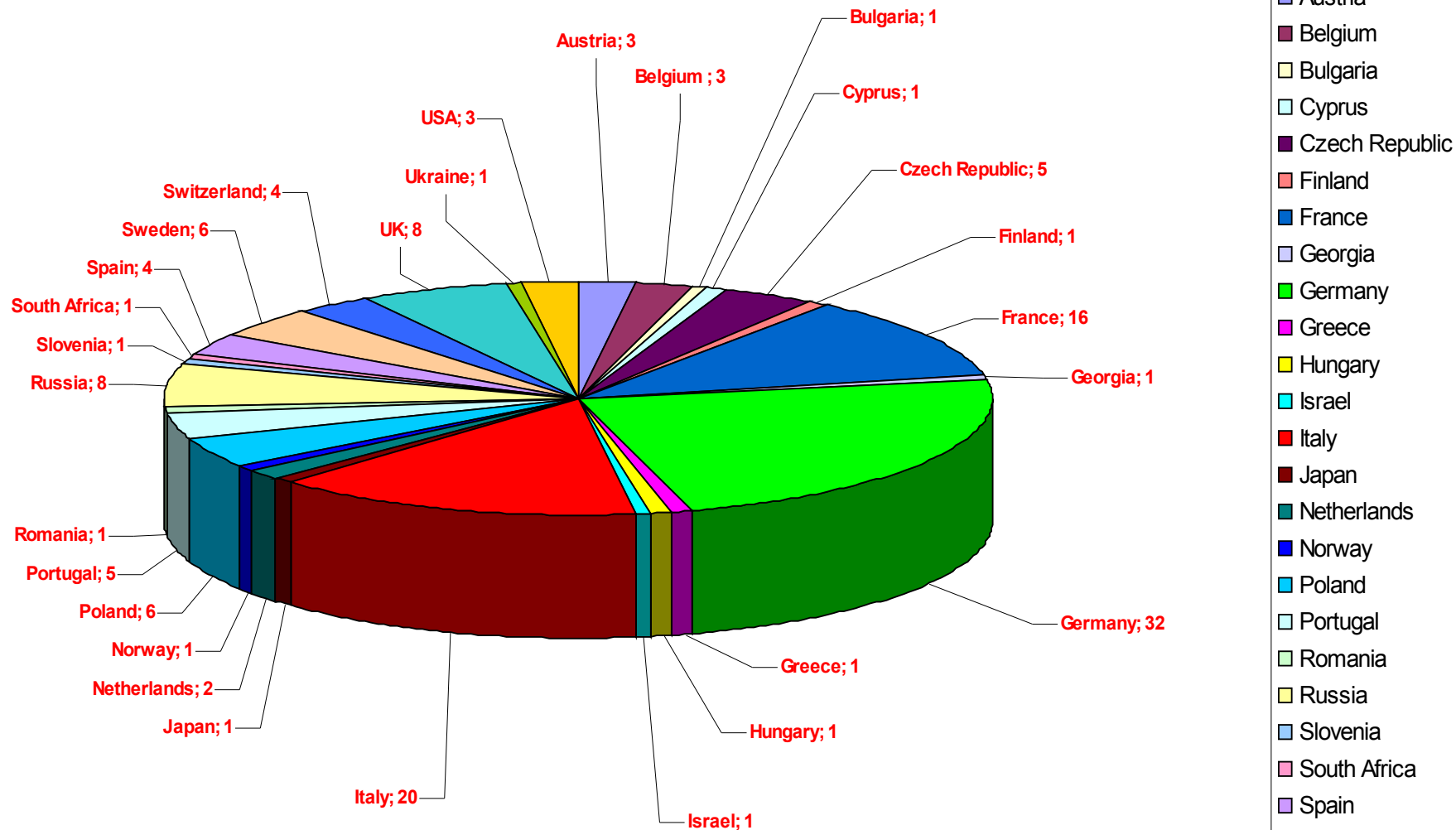
**Coimbra University; FEUP, Porto; IST, Lisbon; BINP, Novosibirsk;  
INR, Gatchina; ITEP, Moscow; JINR, Dubna; LI, Moscow; MEPI,  
Moscow; Petrozavodsk University; PNPI, Gatchina; IJS, Ljubljana;  
Wits University, Johannesburg; Granada University; Stockholm Royal  
Institute of Technology; Bern University; CERN , Geneva; Crystal  
Clear, CERN, Geneva; Zürich University; London University  
Manchester University; Oxford University; Swansea University; UC,  
London ; Kharkov University; JLab; MIT, Boston; UCLA, Los Angeles**

***Third parties in UMR of CNRS :***

***Université Blaise Pascal; École des Mines de Nantes ; Université de  
Nantes ; Université Claude Bernard Lyon 1 ; Université Paris Sud 11***



# Institutions in *HadronPhysics* Project

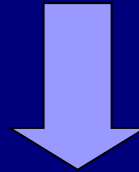


**138 Institutions participating in *HadronPhysics* Project**

# 1<sup>st</sup> pre-financing to the Consortium

According to the Contract (Article 8.2.a):

Community's 1<sup>st</sup> pre-financing sent to the coordinator, corresponding to the 80% of the estimated grant for the first reporting period and for the first six months of the subsequent reporting period is: **6.400.000,00 €**



$$0,8 \times (5.308.000,00 + 2.697.500,00) = \underline{6.400.000,00 \text{ €}}$$

(to be paid by the EC to the co-ordinator)

## **2<sup>nd</sup> pre-financing**

### ***The issues of the Second pre-financing***

## **Determination of the Second pre-financing**

### **Input parameters**

- First pre-financing: 6.400.000,00
- EC Requested Contribution: 5.297.613,04
- Justified and certified amount: 902.610,68
- Remaining pre-financing available to the consortium: 1.102.386,96

## **2<sup>nd</sup> pre-financing**

### ***The issues of the Second pre-financing***

#### **Calculation of the Second pre-financing**

- 80% of (the Reporting Period 2 (P2) estimated grant plus first six months of Reporting Period 3 (P3) estimated grant) ***minus remaining pre-financing:***

$$0,8 \times (5.395.000,00 + 3.861.964,00) - 1.102.386,96$$

$$= 0,8 \times 9.256.964,00 - 1.098.514,96$$

$$= 6.303.184,24 \text{ €}$$

## **2<sup>nd</sup> pre-financing**

### ***The issues of the Second pre-financing***

#### **Application of the Golden Rule**

**80% (Total EC grant – final payments) ≥ total pre-financing.**

The total pre-financing is given in this case by the 1st + 2nd pre-financing minus the part re-qualified as final payment (GSI audit):

$$0,8 \times (17.400.000,00 - 902.610,68) \geq (6.400.000,00 + 6.303.184,24 - 902.610,68)$$

$$13.197.911,46 \text{ €} \geq 11.800.573,56 \text{ €}$$

**SATISFIED**

# EXPENDITURES

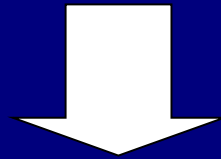
# **Total requested EC contribution**

**Total requested EC contribution 2004 :**

**3.519.129,38 €**

**Total requested EC contribution 2005 :**

**5.099.177,28 €**



**Total requested EC contribution 2004+2005 :**

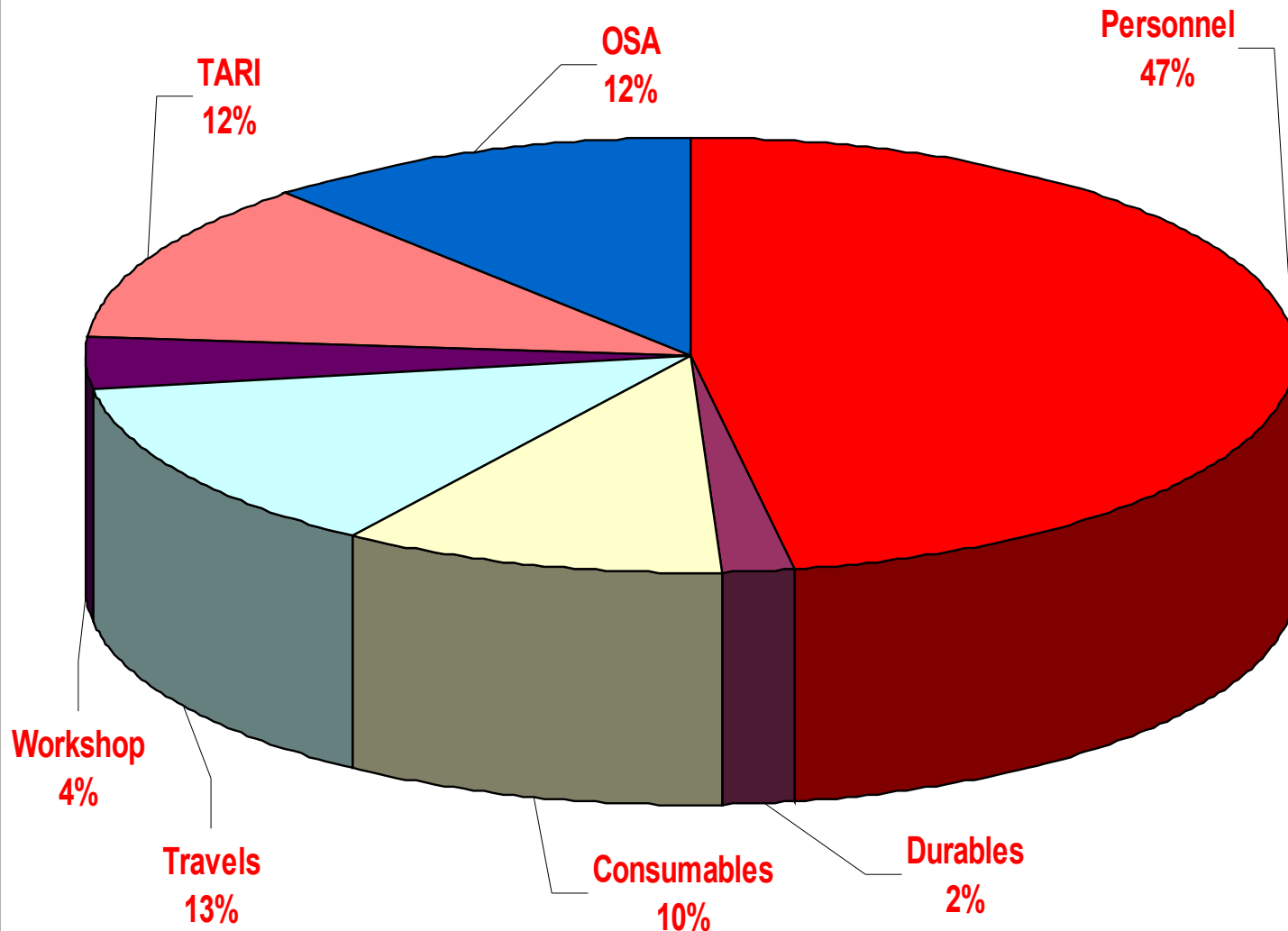
**8.616.047,96 €**



# Total requested EC financial contribution per contractor (2004+2005) (1)

Contr. No.	Contr. Acronym	Total req. EC Contrib.(€)
14	GSI (Germany)	1.402.610,68
1	INFN (Italy)	898.090,41
10	FZJ (Germany)	790.254,59
7	CEA (France)	591.304,14
8	CNRS (France)	560.797,40
25	U Mainz (Germany)	525.382,44
9	DESY (Germany)	461.093,35
18	JLU-PIG (Germany)	336.754,68
12	RUB (Germany)	279.161,17
45	UU (Sweden)	265.871,18
2	ÖAW (Austria)	259.495,17

# Distribution of the EC contribution per budgetary posts



# LEGAL ISSUES

## *1. Modification of the frequency of submission of the audit certificates*

Article 7.2 of the contract is modified as follows:

**Audit reports** shall be submitted **at the latest 45 days after the end of the following periods:**

- **P2** covering reporting periods P1 and P2
- **P4** covering reporting periods P3 and P4

## *2. Modification of the payment modalities*

Article 8. 2(d) of the contract is modified as follows:

**Where less than 70% of a pre-financing has been used at the end of a reporting period**, subsequent intermediate pre-financing may be paid only on the basis of a **complementary periodic management report**.

### ***1. Termination of a Contractor's participation***

- Contractor LIMBURGS UNIVERSITAIT CENTRUM (LUC) has left the Consortium on 01/01/2005

### ***2. Addition of a Contractor***

- Contractor WUPPERTAL UNIVERSITY (BUW) has entered the Consortium on 01/10/2005

## III Amendment approved on 2/02/2006

### 4. Addition of the special clause (n. 23 “Entities composed of one or more legal entities”)

The contractor Centre National de la Recherche Scientifique (**CNRS**) **represents also** the following members: **Université Blaise Pascal, École des Mines de Nantes, Université de Nantes, Université Claude Bernard Lyon 1, Université Paris Sud 11.**

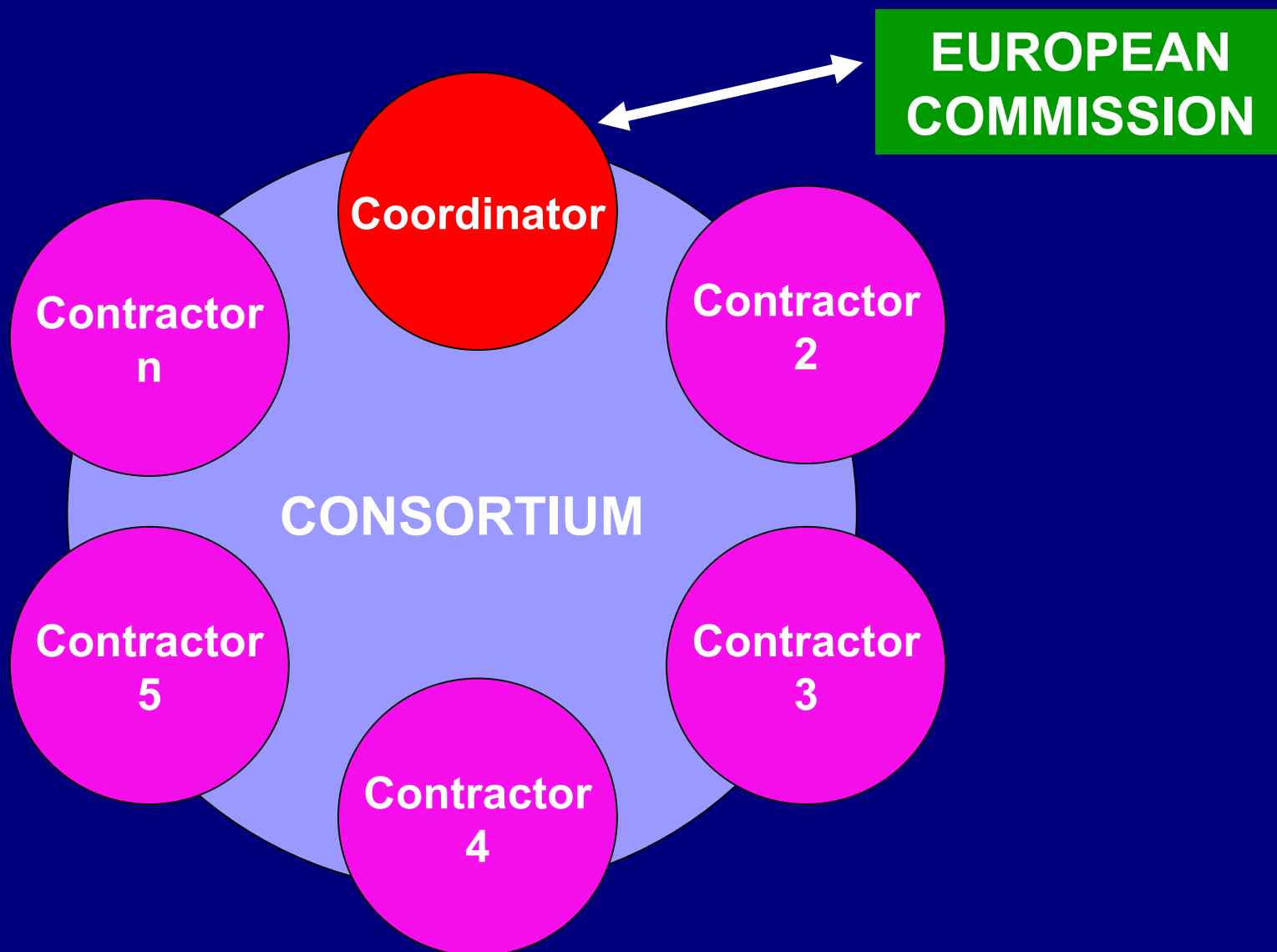
N. UMR (JRU)	Name of laboratory	Short name of laboratory	Name of third party(ies) involved
UMR 6533	Laboratoire de Physique corpusculaire	CNRS/IN2P3-Clermont-Fd (N3 – JRA5)	Université Blaise Pascal
UMR 6457	Laboratoire de physique subatomique et des technologies associées	CNRS/IN2P3-SUBATECH (N3 – N6 – JRA4)	École des Mines de Nantes
			Université de Nantes
UMR 5822	Institut de physique nucléaire de Lyon	CNRS/IN2P3-Lyon (N3)	Université Claude Bernard Lyon 1
UMR 8608	Institut de physique nucléaire d'Orsay	CNRS/IN2P3-Orsay (N3 – JRA2 – JRA5 – JRA8)	Université Paris Sud 11



# MANAGERIAL ISSUES

# Significant dates of the Project

<b>Start date of the contract</b>	<b>➤ 1 January 2004</b>
<b>Entry into force of the contract</b>	<b>➤ 11 May 2004</b>
<b>First pre-financing</b>	<b>➤ 9 June 2004</b>
<b>Approval of the I Amendments to the Contract</b>	<b>21 April 2005</b>
<b>Approval of the First Annual Report</b>	<b>10 June 2005</b>
<b>Second pre-financing</b>	<b>7 September 2005</b>
<b>Approval of the III amendment to the contract</b>	<b>2 February 2006</b>
<b>Delivery to Bruxelles of the Second Annual Report</b>	<b>14 February 2006</b>
<b>Approval of the Mid-Term Review</b>	<b>5 May 2006</b>

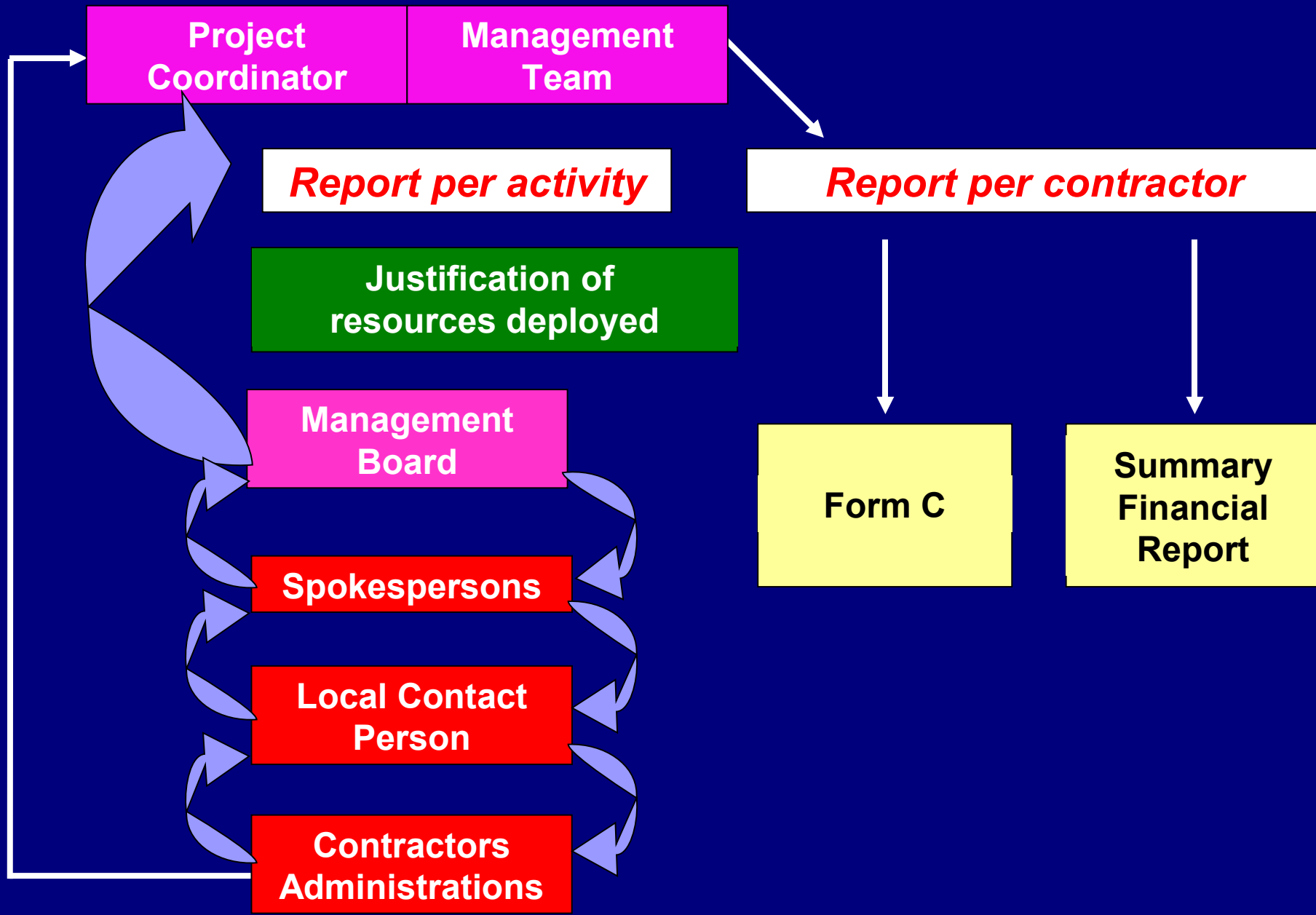


## *Flux of financial information for reporting*

- First annual report  
→ Information per activity
- Second Annual report  
→ Information per contractor

***Problems emerged  
receiving the information***

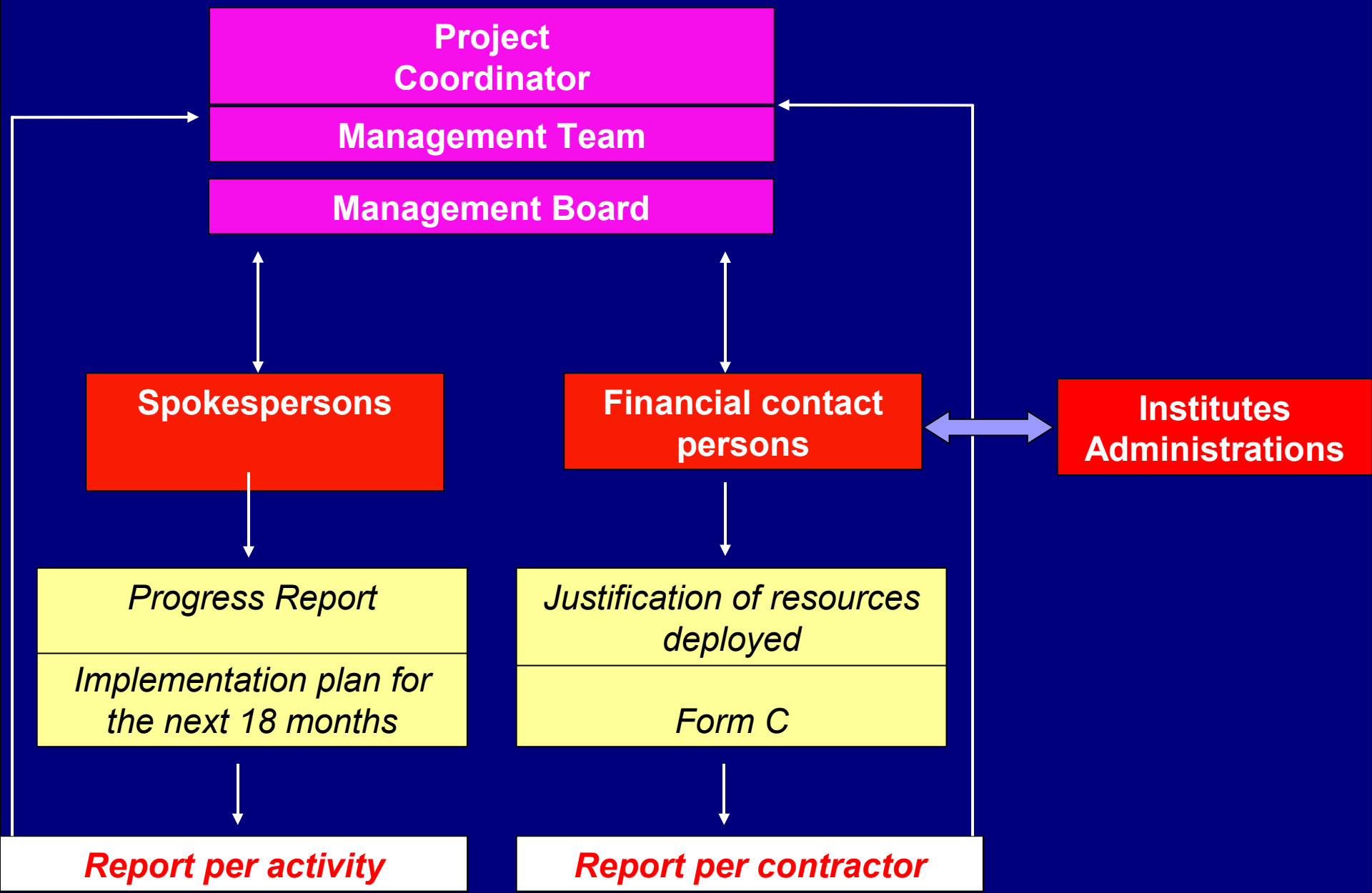
# Preparation of First Annual Report



# Problems emerged

- First Annual report
  - **Unreliable information** received from the spokesperson, due to **lacking of communication with administrations**

# Preparation of Second Annual Report





# Problems emerged

- Second Annual report
  - **Substantial improvement of the quality and reliability** of financial information received directly by the **Financial Contact Persons of Contractors** (*ad hoc* created)
  - **Delays occurred** in the cases where various Institutes belong to the Contractor (**CNRS**, **INFN**, etc.)

# DISSEMINATION OF KNOWLEDGE

- Objectives
- Plans
- Instruments
- Achievements

Actions undertaken to disseminate, promote and exploit the content of knowledge and technology produced by the various activities of the project

# Use and dissemination of knowledge

*Within the  
scientific community*

*Beyond the  
scientific community*

# Actions Undertaken

- Standard scientific tools
- Production of media, illustrating the activities
- Spreading awareness of the results beyond the research community
- Contacts with other scientific communities
- Patentable results

# Standard Scientific Tools

*Publications on  
scientific journals  
(729)*

*Presentations at  
International Conferences  
(932)*

*Organization of meetings  
and workshops  
within the activities  
(305)*

*Co-sponsorship of  
International Scientific  
Events  
(20)*



## ■ 2004

- 58<sup>th</sup> Scottish Universities Summer School in Physics ,  
St. Andrew - Scotland
- HadronPhysics Topical Workshop, St. Andrew - Scotland

## ■ 2005

### ECT\* Workshops

- Resonance in QCD
- Effective theories in Nuclear physics and Lattice QCD
- Quarks, leptons and hadrons in compact stars
- Parton Propagation through Strongly Interacting Matter

## ■ 2005

### Other Events

- EXA05 – International Conference on Exotic Atoms - Vienna, Austria
- The International Workshop on Transverse Polarisation Phenomena in Hard Processes (Transversity 2005) – Como, Italy
- EINN 2005 – 6<sup>th</sup> European Research Conference on Electromagnetic Interactions with Nucleons and Nuclei – Milos Island, Greece
- N05 – Workshop on Nucleon Form Factors – Frascati, Italy

## ■ 2006

### ECT\* Workshops

- ECT\* Workshop: Numerical Simulations of Heavy Ion Reactions in the Fermi Energy Domain
- ECT\* Workshop: The Physics of High Baryon Density
- ECT\* Workshop: Generalized Parton Distribution – the Present Status
- ECT\* Workshop: Exotic hadronic atoms, deeply bound kaonic nuclear states and antihydrogen: present results, future challenges
- ECT\* Workshop: Heavy Ion Reactions at Ultrarelativistic Energies
- ECT\* Workshop: Observables in Anti-Proton interactions and their relevance in QCD

## ■ 2006

### Other Events

- Channeling 2006 – Frascati, Italy
- The Shape of Hadrons - International Workshop – Athens, Greece
- International Conference PAVI06 – From Parity Violation to Hadronic Structure and more... – Milos Island, Greece
- Spin in Hadron Physics – Tbilisi, Georgia

# Actions Undertaken

- Standard scientific tools
- **Production of media, illustrating the activities**
- **Spreading awareness of the results beyond the research community**
- Contacts with other scientific communities
- Patentable results

# Production of media

- Public lectures in major European research centres and industries
- Press release, informative reports, press conferences

Exploring **societal implications** of the work proposed in the project

" **With the aim to acquaint citizens with them**

Two leading examples:

*INFN*

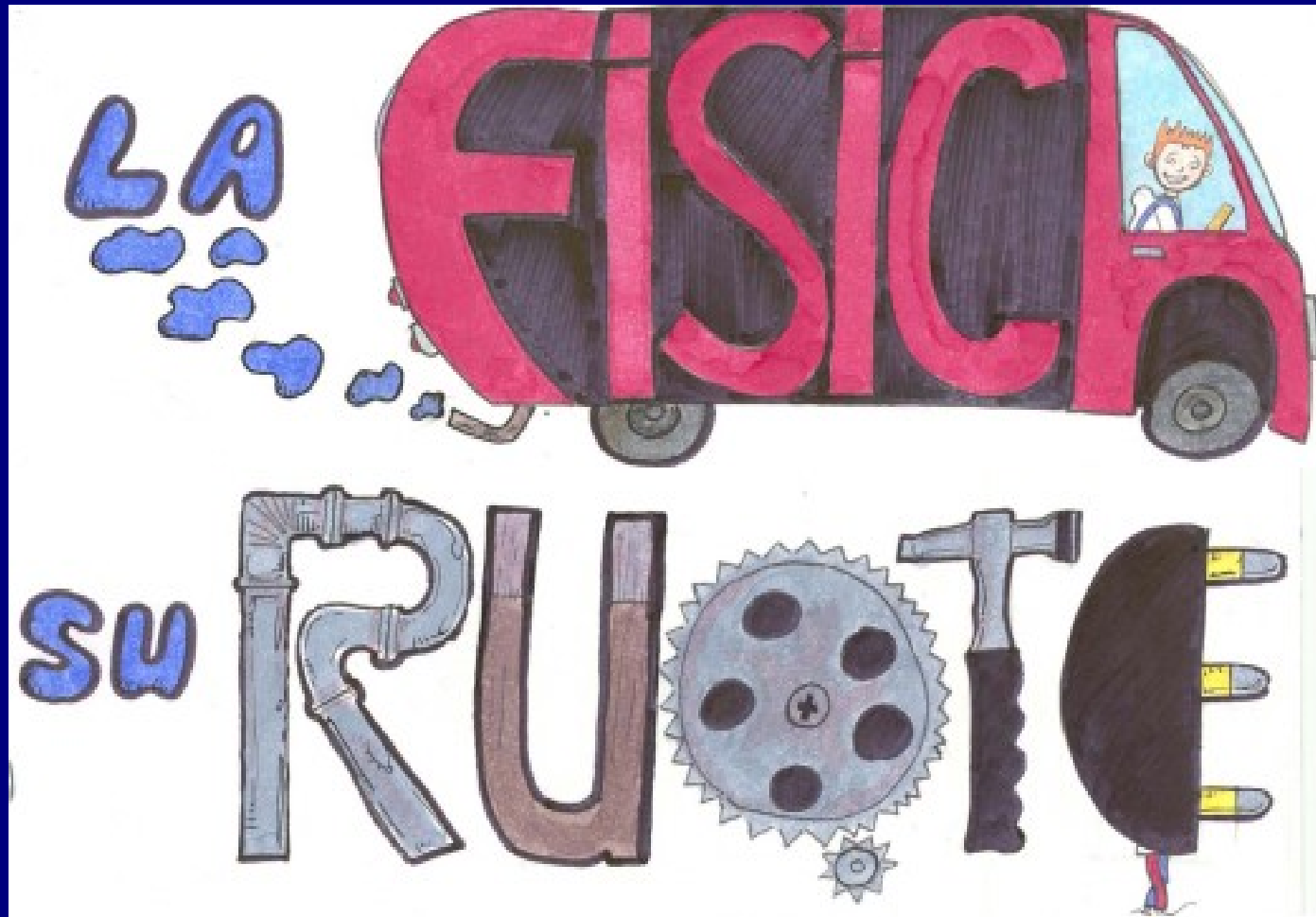
*GSI*



*Physics on Wheels:  
Travelling Laboratory*

*Physics Microscopes*

**"Physics on the road"**  
**The wandering Physics Lab**  
**of the Italian National Institute for**  
**Nuclear Physics**



*Week of Scientific and  
Technological Culture*

*Meetings of Physics  
(high-school teachers,  
journalists, students)*

*Promotional activities  
to steer students*

*Guided visits  
to the Laboratories*

# GSI: Continuous activities

*Guided Tours*

*Seminars for  
visiting groups*

*Presentations in  
the press, radio, TV*

*Travelling Exhibition:  
“The journey to  
the Big-Bang”*

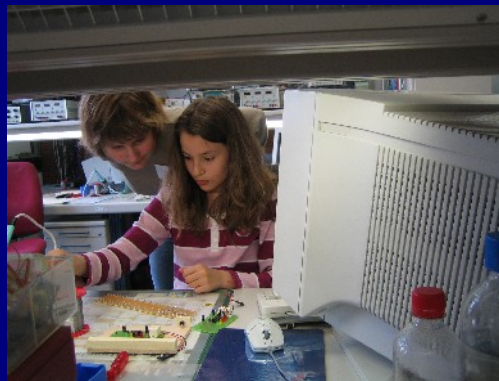
# GSI: Annual events

*Saturday Morning Physics*

*International Students Program*

*Girls Day*

# GIRLS DAY



## Instruments to promote and exploit the produced knowledge



*The Management of the Consortium*

*The Dissemination Board*

*The Web-Site*



# The Management of the Consortium

- Keeping the Consortium informed
- Acting towards the European Commission
- Presenting the progress of the project in European forums
- Establishing organic relations with leading institutions

# The Dissemination Board

- Structural element of the Consortium to disseminate the knowledge produced by the project
- To deliver to the scientific community updated information on the project
- To bridge knowledge from the scientific community to the general public

# The Web-site

⇒ **An adaptable website, able to respond to the needs, by-and-large usable**

**<http://hadronphysics.infn.it>**

# Site policy

- In the HadronPhysics web-site **information is public and accessible.**
- The information consisting of published results or Consortium documents (e.g. the contract), EC documentation, etc., is accessible by anyone.
- **The following parts** of the HadronPhysics web-site **are accessible only to the activity spokespersons or chairpersons** of managerial bodies (or to authorized persons):
  - I) Financial information
  - II) Information such as scientific preliminary results, drafts of annual or periodic reports, etc.
  - III) Working documents of a managerial structure

## Core activities



## HadronPhysics Highlights

Three significant pictures and a number of short presentations of recent relevant achievements in a CERN Courier-like editing.

# An adaptable website

**The website will continue improving,  
changing and responding to  
the needs of the Community.**

**Graphics, conceptual structure  
and tools will be changed  
to serve these objectives.**



# **Seventh Framework Programme**

## **FP7**





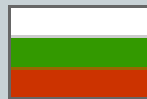
# European Union Member States



 <b>Austria</b>	 <b>Belgium</b>	 <b>Czech Republic</b>	 <b>Cyprus</b>	 <b>Denmark</b>
 <b>Estonia</b>	 <b>Finland</b>	 <b>France</b>	 <b>Greece</b>	 <b>Germany</b>
 <b>Hungary</b>	 <b>Ireland</b>	 <b>Italy</b>	 <b>Latvia</b>	 <b>Lithuania</b>
 <b>Luxembourg</b>	 <b>Malta</b>	 <b>Netherlands</b>	 <b>Poland</b>	 <b>Portugal</b>
 <b>Slovakia</b>	 <b>Slovenia</b>	 <b>Spain</b>	 <b>Sweden</b>	 <b>United Kingdom</b>



# Candidate countries



**Bulgaria**



**Croatia**



**Romania**



**Turkey**



# Associated Countries



**Iceland**



**Israel**



**Liechtenstein**



**Norway**



**Switzerland**

# Focus on the new Lisbon Strategy

## What is the Lisbon Strategy?

When the European Council met in Lisbon, Portugal, in March 2000, EU leaders adopted a ten-year programme aimed at revitalising growth and sustainable development across the EU:

- make Europe a more attractive place to live and work
- invest in knowledge and innovation for growth
- create more jobs
- Using all available instruments: the Structural Funds (SF), the R&D Framework Programme (R&D FP) and the Competitiveness and Innovation Framework Programme (CIP) (plus other related initiatives)

# Barcelona Summit, March 2002

- Aim to increase the average level of expenditure on R&D to 3% of GDP by 2010.

# **'3%' Objective**

## **What is at stake?**

### **EU-US R&D Gap**

€ 130 bn every year & growing

- ❑ Public funding gap € 25 bn
- ❑ Business funding gap € 105 bn

### **Estimated gains if EU reaches 3% in 2010**

- ❑ *Until 2010 :*

+0.25% GDP every year

+2 million jobs over 2004-10

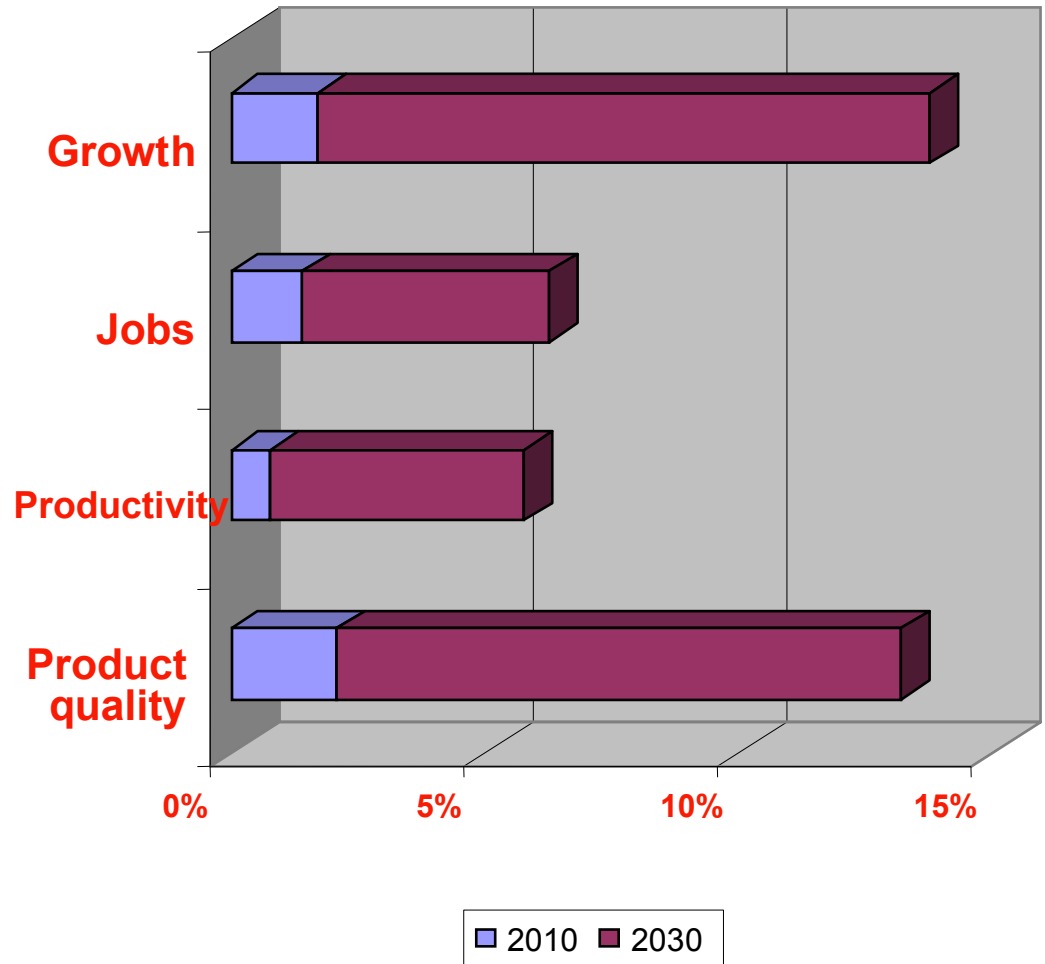
- ❑ *After 2010 :*

+0.5% GDP every year

**+400,000 net jobs every year**

Carlo Guaraldo

### **Long term gains : by 2010 and by 2030**

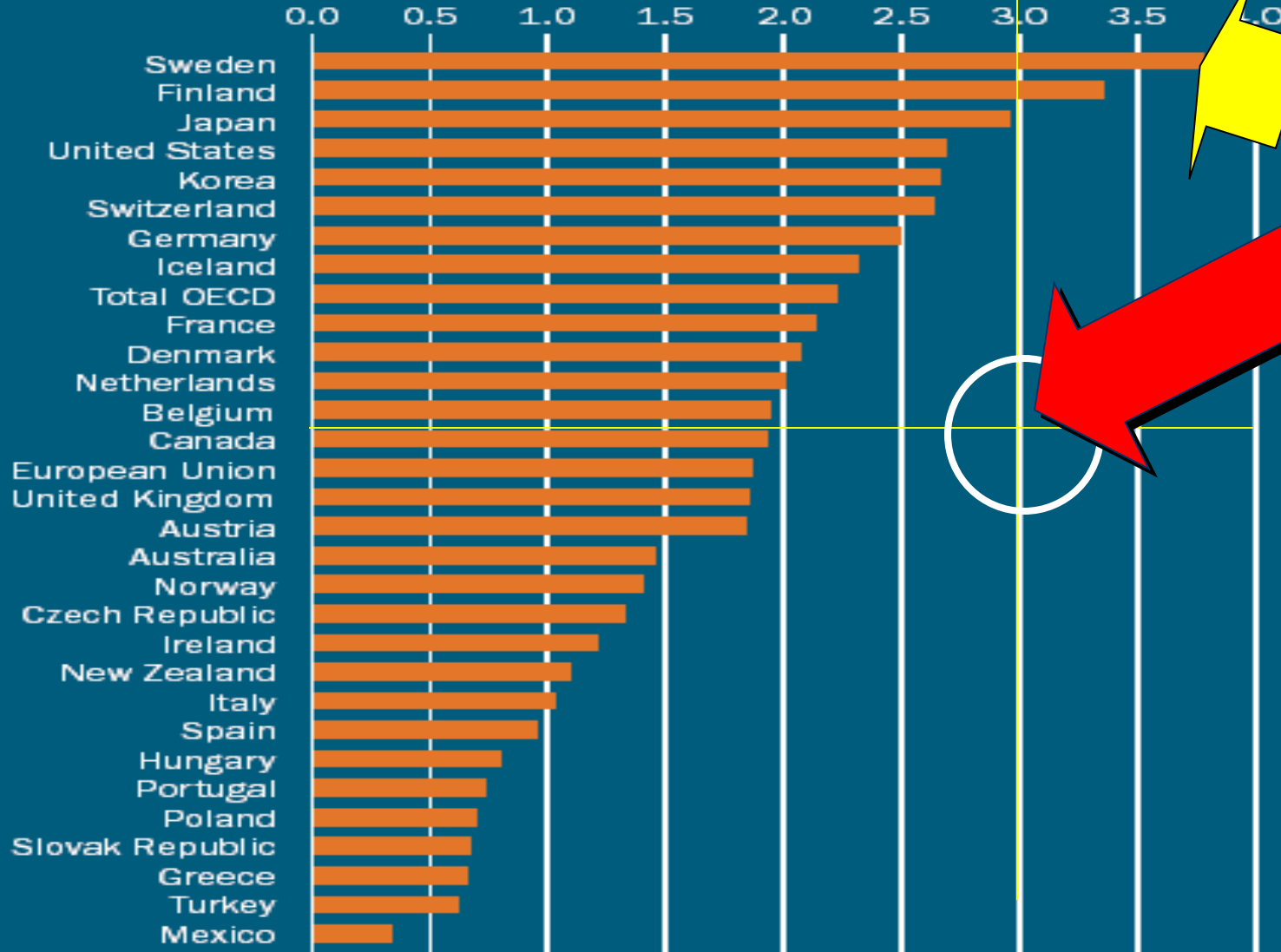


Gains from reaching 3% R&D by 2010  
compared to statu quo

# **R&D Percentage of Gross Domestic Product 2000 (or most recent year)**

SE: 4.27% GDP

2004 data



Research Intensity (GERD/GDP)

Source OECD



# **Commission Proposal for the SEVENTH FRAMEWORK PROGRAMME**



# Specific Programmes

***Cooperation* – Collaborative research**

***Ideas* – Frontier Research**

***People* – Human Potential**

***Capacities* – Research Capacity**

**+**

**JRC (non-nuclear)**

**JRC (nuclear)**

**Euratom**

# ***Cooperation – Collaborative research***

## ***9 Thematic Priorities***

- 2. Health**
- 3. Food, agriculture and Biotechnology**
- 4. Information and Communication Technologies**
- 5. Nanosciences, Nanotechnologies, Materials and new Production Technologies**
- 6. Energy**
- 7. Environment and climate change**
- 8. Transport**
- 9. Socio-Economic Sciences and the Humanities**
- 10. Space and Security research**

# Cooperation

## *Collaborative research actions – support schemes*

Collaborative research

Joint Technology Initiatives

Coordination of national  
research programmes

- ERA-NET
- ERA-NET+
- Article 169

International Cooperation

# Ideas – Frontier Research

- Pan-European mechanism to support the truly creative scientists
- “Frontier research”: new understating of basic research
- “Investigator driven” approach, allowing researchers to propose their own topics. Grants will be provide for individual teams, leaving the flexibility for a team to consist of any grouping of researchers appropriate for the conduct of the projects, from one single institution or several institutions, in one country or across national borders
- Scientific excellence and not administrative requirements should drive the formation of the teams
- Differentiation from national funding actions in basic research by its strategic objectives and European scope

**European Research Council (ERC)** created to implement the Ideas programme

# *People* – Human Potential

## Initial training of researchers

Marie Curie Networks

## Life-long training and career development

Individual Fellowships

Co-financing of regional/national/international programmes

## Industry-academia pathways and partnerships

Industry-Academia Scheme

## International dimension

Outgoing International Fellowships; Incoming International Fellowships

International Cooperation Scheme; Reintegration grants

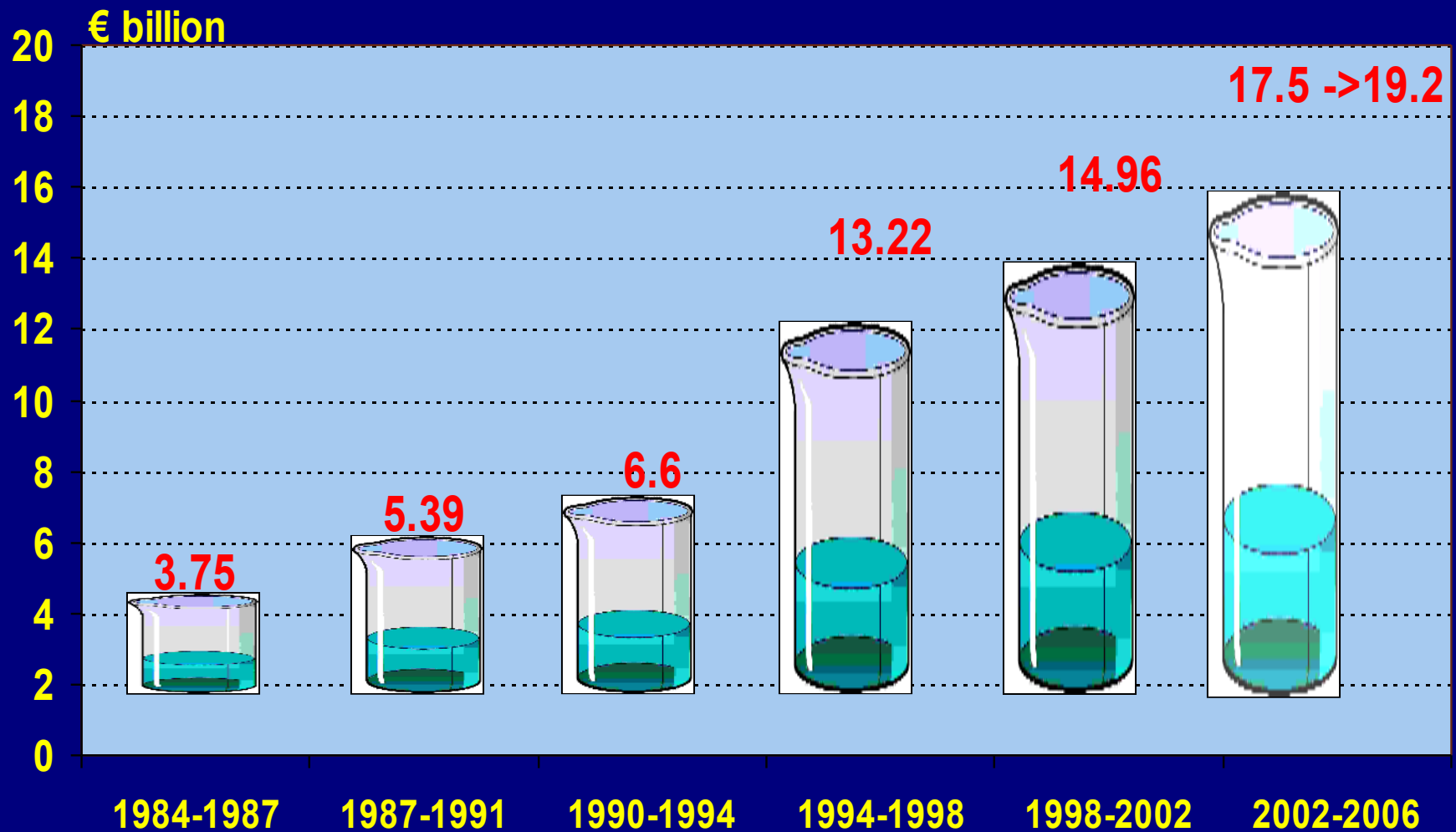
## Specific actions

Excellence awards

# ***Capacities* – Research Capacity**

- 2. Research Infrastructures**
- 3. Research for the benefit of SMEs**
- 4. Regions of Knowledge**
- 5. Research Potential**
- 6. Science in Society**
- 7. Activities of International Cooperation**

# Framework Programmes: The budget per year over time



# FP7 Budget Provisions

Main new elements compared to FP6:

- ▣ Annual budget 4 billion € ► 7 billion €
- ▣ Total ~ 50 billion €
- ▣ 7 years framework not 5.



# Budget breakdown of the FP7 (01.01.2007-31.12.2013) (in million €)

CAPACITIES	Themes	April 2005	May 2006(*)
	Research Infrastructures	(3961)	<b>2008</b>
	Research for the benefit of SMEs	(1901)	<b>1266</b>
	Regions of Knowledge	(158)	<b>126</b>
	Research Potential	(554)	<b>350</b>
	Science in Society	(554)	<b>359</b>
	Activities of International Co-operation	(358)	<b>182</b>
TOTAL CAPACITIES		(7486)	<b>4291</b>
TOTAL EC FP7		(72726)	<b>50521</b>

(\*) Commission's amended proposals of May 2006;  
approved by EU Parliament on 15 June 2006

# **European Community FP7 Participation Rules**

**(Commission proposal adopted 23.12.05)**

# Minimum conditions for participation

## General:

- ❑ **Three independent participants from three different Member States (MS) or Associated countries (Ac)**
- ❑ **Natural persons may participate**
- ❑ **JRC may participate and is deemed to be from a different MS or associated country (same principles for international European interest organisations and entities established under Community law)**
- ❑ **Additional conditions can be established by the work programme or specific programme (i.e. re number of participants, place of establishment, type of participant)**
- ❑ **Sole participants composed of members that meet the criteria above can participate**

# Community financial contribution

## Eligibility for Funding

- Legal entities from Member States and Associated countries or created under Community law (and JRC)
- International European interest organisations
- Legal entities established in international cooperation partner (INCO) countries

and

International organisations, third countries other than INCO, if provided for in specific programme or work programme; or essential for carrying out action; or provision for funding is provided for in a bilateral agreement between Community and the third country

# Community financial contribution

## Basis for Funding:

- Reimbursement of eligible costs
- Flat rates, including scale of unit costs
- Lump sum amounts

# Reimbursement of eligible costs

- Cost reporting models eliminated
- Participants charge direct and indirect costs (option of flat rate for those who do not or can not charge real indirect costs)
- Costs must be actual; incurred during the project; determined according to the usual accounting and management principles/practices and used only to achieve project objectives, and consistent with principles of economy, efficiency and effectiveness; recorded in accounts and paid (or the accounts of third parties); exclusive of non-eligible costs

# Maximum funding rates

- ▣ **Research and technological activities – 50% of eligible costs except that for:**
  - ▣ Public bodies – 75%
  - ▣ Secondary and higher education establishments – 75%
  - ▣ Research organisations (non-profit) – 75%
  - ▣ SMEs – 75%
- ▣ **Demonstration activities – 50% of eligible costs**
- ▣ **Other activities – 100% of eligible costs**
- ▣ **Frontier research actions – 100%**
- ▣ **Coordination and support actions – 100%**
- ▣ **Training and career development of researchers actions – 100%**

# Information

- EU research: <http://europa.eu.int/comm/research>
- Seventh Framework Programme: [http://europa.eu.int/comm/research/future/index\\_en.cfm](http://europa.eu.int/comm/research/future/index_en.cfm)
- RTD info magazine: <http://europa.eu.int/comm/research/rtdinfo/>
- Information on research programmes and projects: <http://www.cordis.lu>
- Information requests: [research@cec.eu.int](mailto:research@cec.eu.int)

