



What is

- **Nuclear Physics European Collaboration Committee**
 - founded **1988** by subscribing **national research councils**, who nominate nuclear scientists as their representatives to be appointed by the European Science Foundation, **ESF**, for 3-6 years
- **Objective of NuPECC:**
 - “To strengthen European collaboration in **nuclear science** through the promotion of **nuclear physics and its trans-disciplinary use and application** in collaborative ventures between research groups within Europe and particularly those from countries linked to the ESF”



- has currently 28 members from **20** countries
 - Bulgaria intends to join in 2011
 - Ongoing talks with
 - Slovenia
 - Slovakia
 - Russia
- meets 3 times a year in different member states



- Founded **1974**
- **79** member organisations
 - Science Ministries
 - Research Councils
 - Academies
- from **30** countries

What does

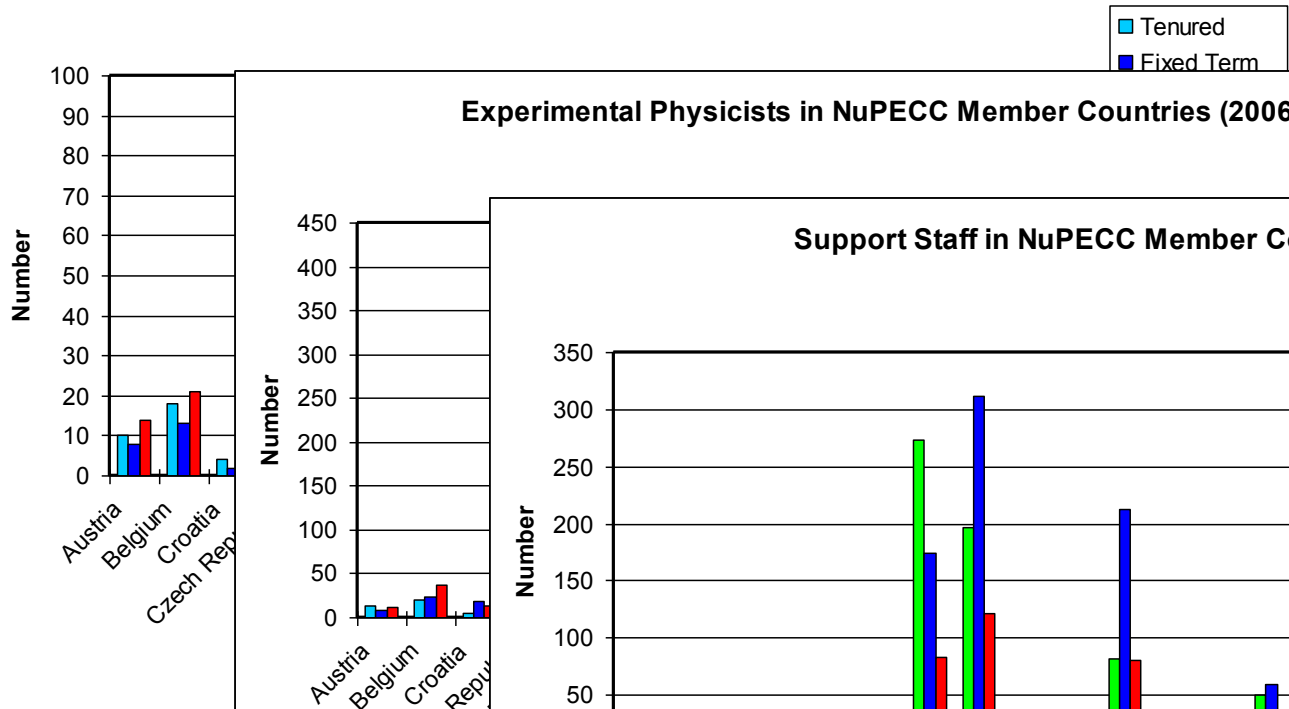
- Identifies key scientific issues
- Launches new Projects
- Performs surveys of human resources
- Develops Long Range Plans
- Issues publications
- Interacts with stakeholders

Launch of New Projects

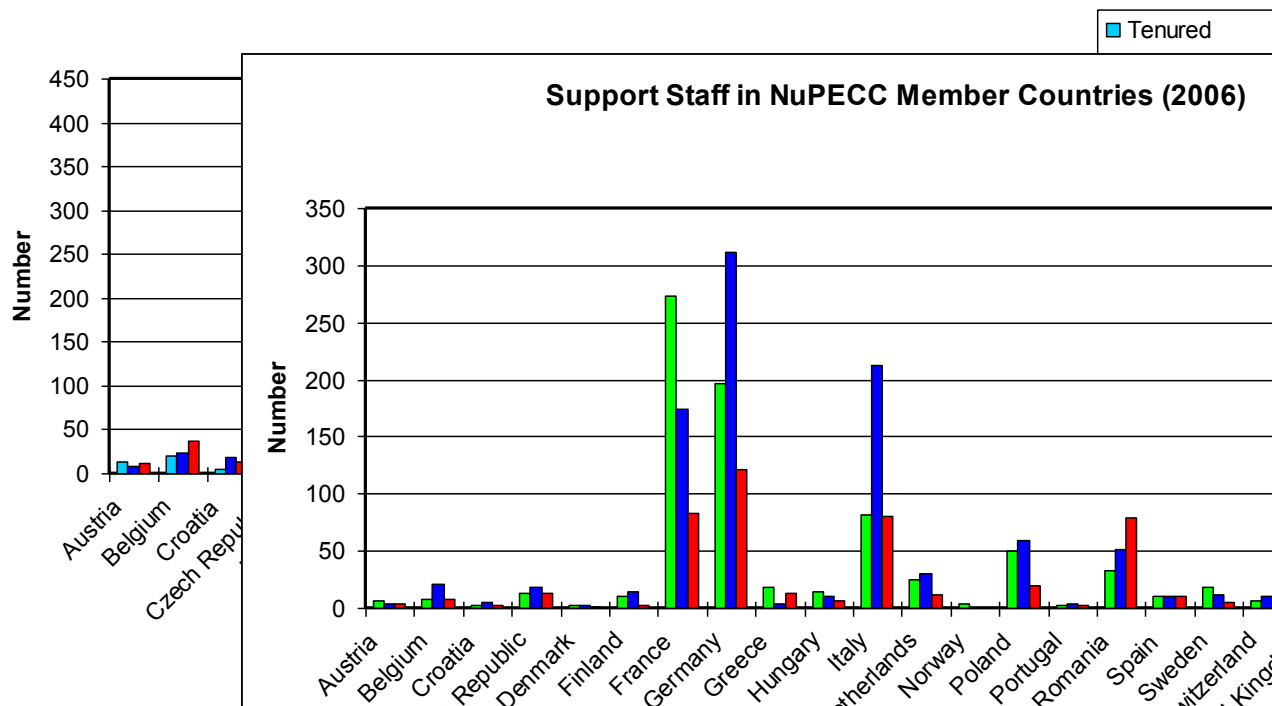
- **EU Framework 6 Programme**
 - Integrated Infrastructure Initiatives, I3s
 - **HadronPhysics** - Strongly Interacting Matter
 - **EURONS** - Nuclear Structure and Reaction Dynamics
 - Design Studies
 - **FAIR** (DIRACsecondary-Beams)
 - **EURISOL**
- **EU Framework 7 Programme**
 - Integrating Activities, IAs
 - **HadronPhysics2** - Hadron Structure & Spectroscopy
 - **ENSAR** - Nuclear Science & Applications
 - **SPIRIT** - Applied Nuclear Physics
- **Electron-nucleon/ion colliders: ENC @ FAIR,
LHeC @ CERN**

Survey of Human Resources

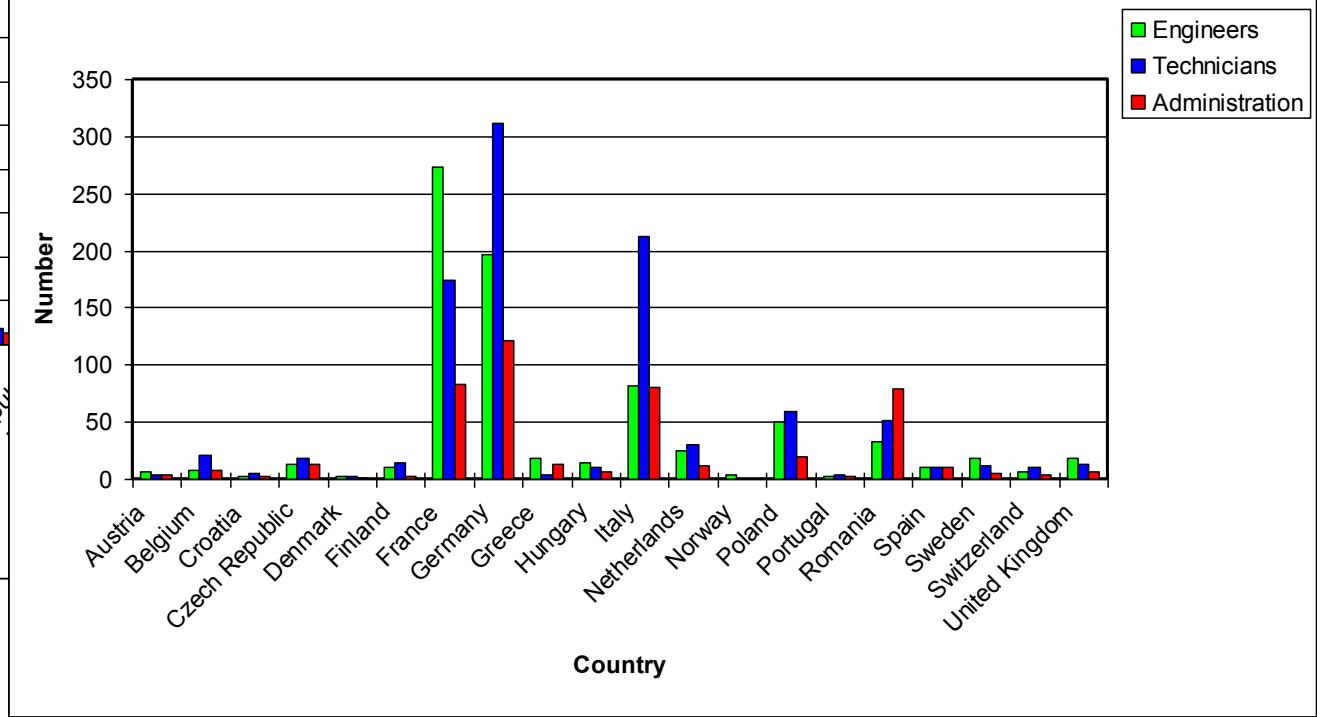
Theoretical Physicists in NuPECC Member Countries (2006)



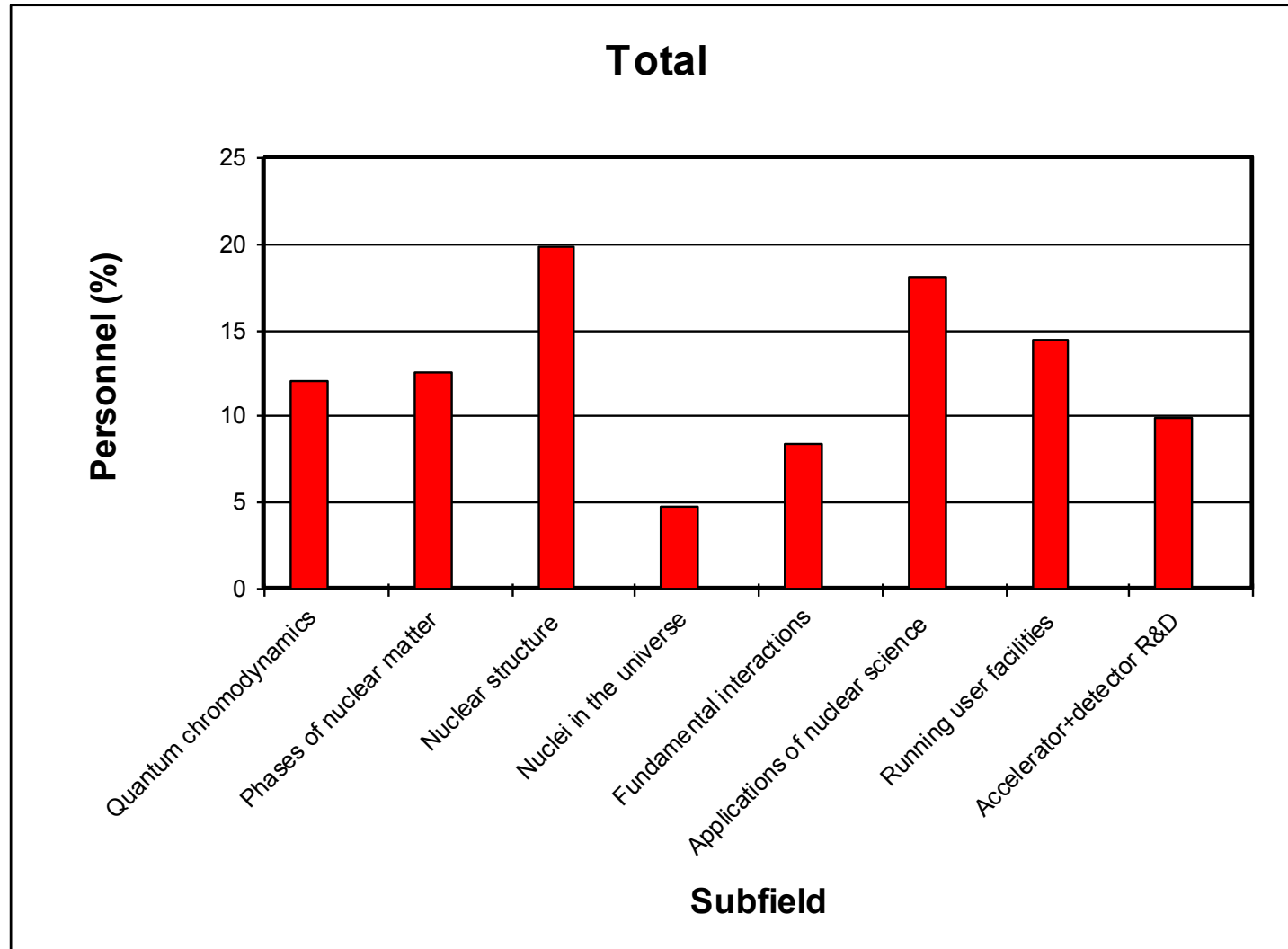
Experimental Physicists in NuPECC Member Countries (2006)



Support Staff in NuPECC Member Countries (2006)



...in Various Key Subfields



Publications

- Web: www.nupecc.org
- Nuclear Physics News
 - 4 issues p.a., 6000 subscribers in Europe, North America & Japan
- Handbook of Facilities Access
- Survey of Resources
- Topical Reports
- Long Range Plans
- Outreach activities
 - Brochures
 - Radioactive Beams
 - Nature at the Femto-scale
 - Public Awareness of Nuclear Science, PANS
 - www.nupecc.org/pans
 - Nuclear Physics Experience, NUPEX
 - www.nupecc.org/NUPEX

- **Europe**

- European Science Foundation, **ESF**
- **EU FP 4-7:**
 - NuPECC initiated 7 Networks, **I3s** & **IAs** (ca. 2000 scientists & engineers each)
 - NuPECC initiated ERA-net “**NuPNET**” (funding agencies)
- NuPECC roadmaps → **ESFRI**
- Cross membership **EPS** Nuclear Physics Board, **NPB**
- Observer on Particle Physics’ **ECFA** committee

- **Globally**

- Cross membership on DoE & NSF’s Nuclear Science Advisory Committee, **NSAC**
- Cross membership with Asian Nuclear Physics Association, **ANPhA**
- Interactions with recently founded Latin American **ALANFA**
- International Union of Pure and Applied Physics, **IUPAP:**
 - European representative in Working Group on **Int’l Coordination of Nuclear Physics, WG.9**
- United Nations, **OECD:**
 - European member of Working Group on Nuclear Physics, **Global Science Forum**

NuPECC Long Range Plan 2010

Perspectives of Nuclear Physics in Europe

LRP2010 Objectives

- Review status of the field
- Issue recommendations to advance
 - The science &
 - Its applications in Europe
- Develop action plan
 - Roadmap for
 - Upgrading existing Nuclear Physics facilities
 - Building new large-scale Research Infrastructures
- Collaborate closely with
 - EU FP7 projects
 - IAs: “HadronPhysics2”, “ENSAR” and “HadronPhysics3”
 - ERA-net “NuPNET” (18 European funding agencies)
- Put European Nuclear Physics into worldwide context
 - NSAC (DoE & NSF) in USA, ANPhA in Asia, ALANFA in Latin America
 - IUPAP
 - OECD Global Science Forum

Outline LRP2010

- **Executive Summary**
 - Purpose, Scientific & Societal Scope, Objectives
 - Science Case
 - Research Infrastructures & Networking
 - Scientific Themes
- **Recommendations & Roadmap**
- **Research Infrastructures & Networking**
 - Existing Research Infrastructure & Upgrades
 - Future Research Infrastructures
 - Collaboration at European and Global Level
- **Scientific Themes**
 - **Hadron Physics**
 - **Phases of Strongly Interacting Matter**
 - **Nuclear Structure & Dynamics**
 - **Nuclear Astrophysics**
 - **Fundamental Interactions**
 - **Nuclear Physics Tools & Applications**

Working Groups

1) Hadron Physics

– Convener: U. Wiedner (U Bochum)

- Experts: C. Alexandrou, M. Anselmino, R. Beck, M. Birse, T. Bressani, M. Guidal, T. Hennino, F. Maas, U. Meissner, K. Peters, A. Schaefer, M. Soyeur, A. Szczurek, M. Vanderhaeghen

2) Phases of Strongly Interacting Matter

– Convener: P. Giubellino (INFN Torino)

- Experts: G. Cardella, F. Gulminelli, A. Kugler, J. Nystrand, J.-Y. Ollitrault, M. Petrovici, K. Redlich, P. Senger, R. Snellings, J. Wessels, U. Wiedemann

3) Nuclear Structure & Dynamics

– Convener: R. Julin (JYFL Jyväskylä)

- Experts: N. Alahari, T. Aumann, Y. Blumenfeld, P. Butler, H. Fynbo, A. Gadea, W. Korten, A. Maj, G. Neyens, T. Nilsson, R. Roth, P. Rousset-Chomaz, C. Scheidenberger, A. Vitturi, Dario Vretenar

4) Nuclear Astrophysics

– Convener: B. Fulton (U York)

- Experts: N. Chamel, Z. Fülöp, F. Hammache, M. Heil, J. José, F. de Oliveira, P. Prati, T. Rauscher, S. Romano, K. Sonnabend, C. Vockenhuber, P. Woods

5) Fundamental Interactions

– N. Severijns (KU Leuven)

- Experts: R. Calabrese, G. Drexlin, D. Horvath, K. Kirch, K. Pachuki, F. Piquemal, S. Schönert, R. Timmermans, C. Volpe, Ch. Weinheimer, O. Zimmer

6) Nuclear Physics Tools & Applications

– Convener: S. Leray (IRFU Saclay)

- Experts: J. Benlliure, A. Boston, M. Durante, S. Gammino, J. G. Camacho, M. Huyse, J. Kucera, P. Moretto, L. Sihver, C. Trautmann

RIs & Networking

- Existing Research Infrastructures & Upgrades
 - Theory & Computing
 - Lepton Beam Facilities
 - Hadron Beam Facilities
 - Smaller Scale Facilities
- Future Research Infrastructures
 - ESFRI Roadmap Facilities
 - Major Upgrades of Existing Facilities
 - Travelling Detectors
 - Projects & Design Studies
- Networking
 - Europe
 - ESF
 - EU
 - FP7 IAs “HadronPhysics2”, “ENSAR”, “HadronPhysics3”
 - FP7 ERA-net “NuPNET”
 - EPS / NPB
 - ECFA
 - Outwith Europe
 - NSAC, ANPhA, ALANFA
 - Globally
 - IUPAP WG.9
 - OECD Global Science Forum

Facilities



Large-scale:

- GSI

FAIR

- GANIL

SPIRAL2



FAIR

Nuclear Structure & Astrophysics

(Rare-isotope beams)

Hadron Physics

(Stored and cooled anti-protons)

QCD-Phase Diagram

(HI beams 2 to 45 GeV/u)

Dense Bulk Plasmas

(Ion-beam bunch compression & petawatt-laser)

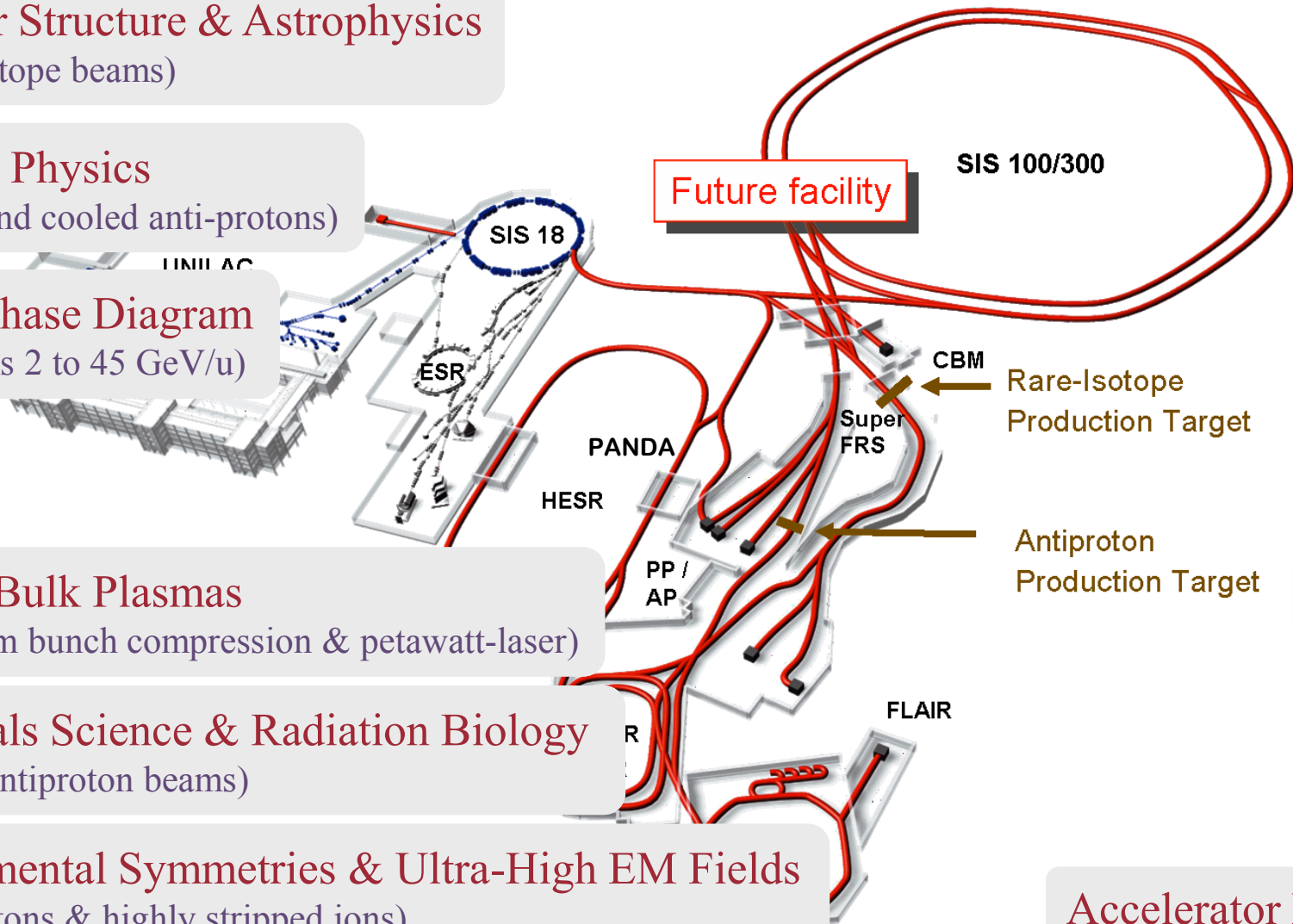
Materials Science & Radiation Biology

(Ion & antiproton beams)

Fundamental Symmetries & Ultra-High EM Fields

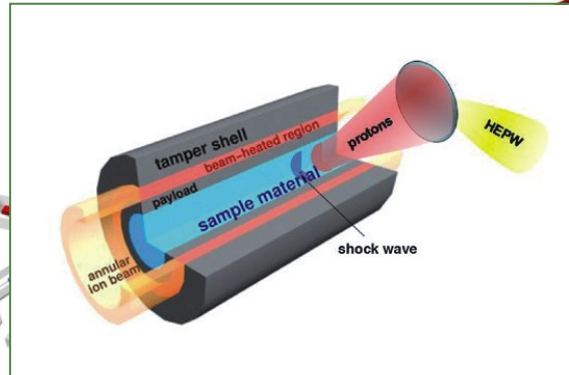
(Antiprotons & highly stripped ions)

Accelerator Physics

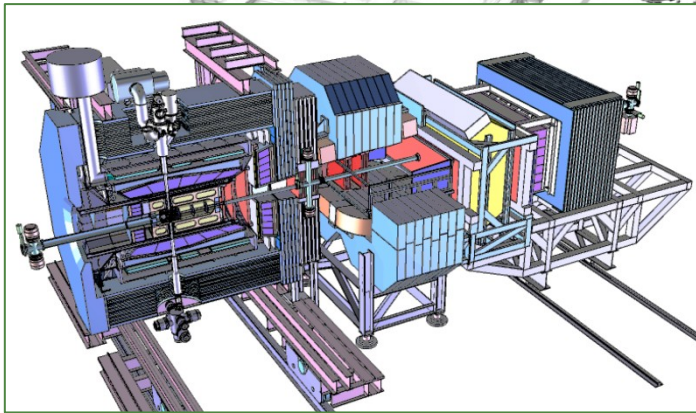
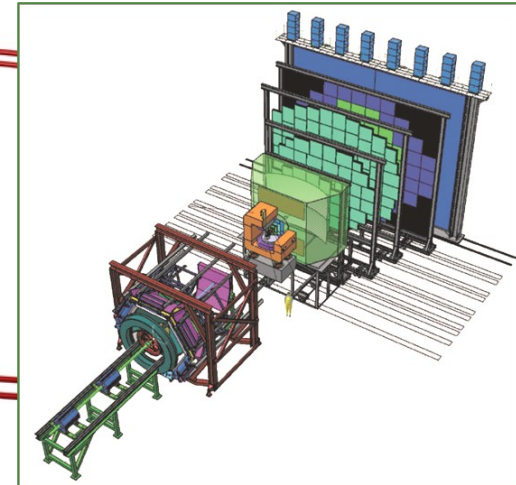


FAIR Experiments

APPA



CBM



PANDA

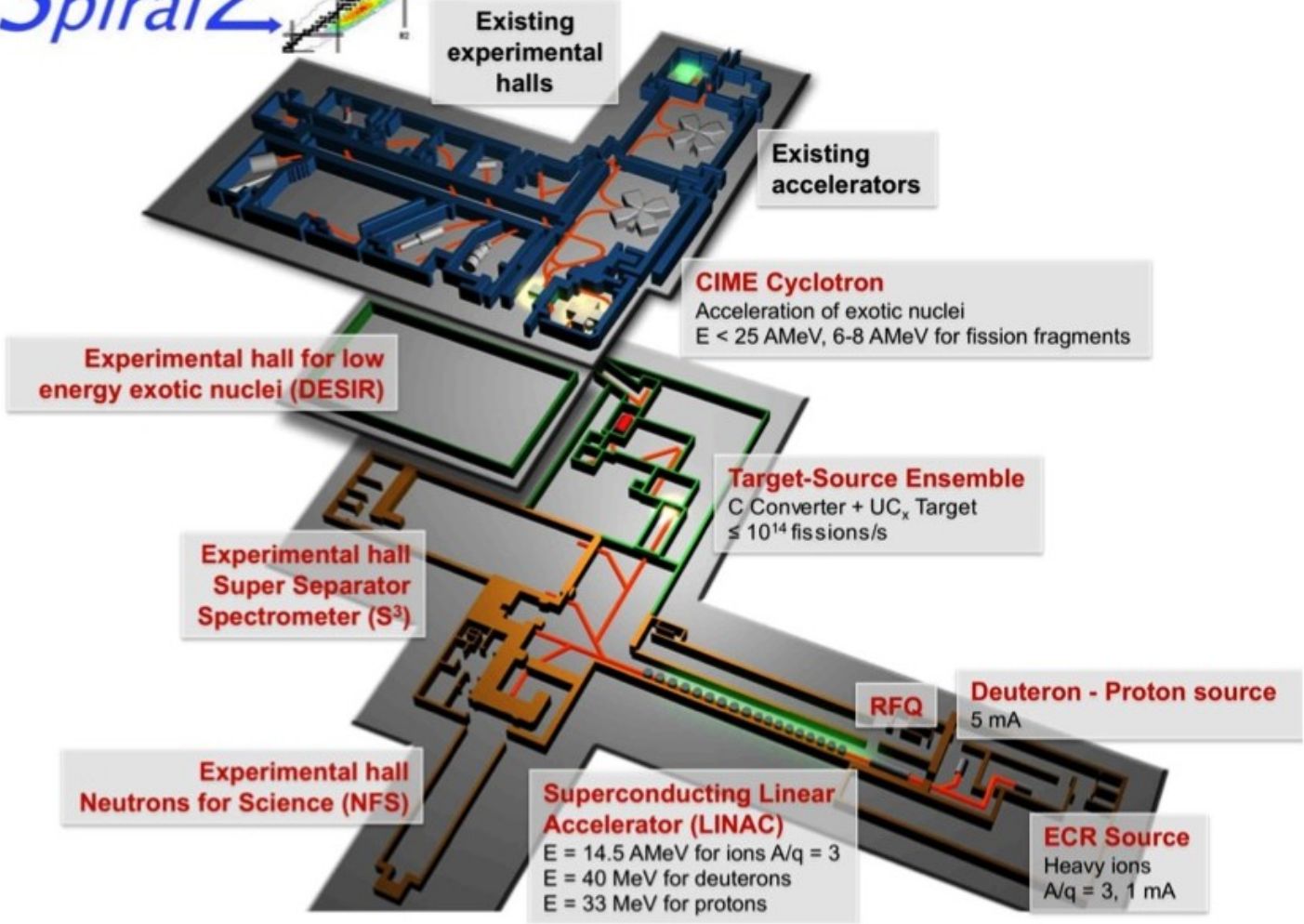
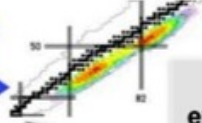


NuSTAR

SPIRAL2 @ GANIL



Spiral2



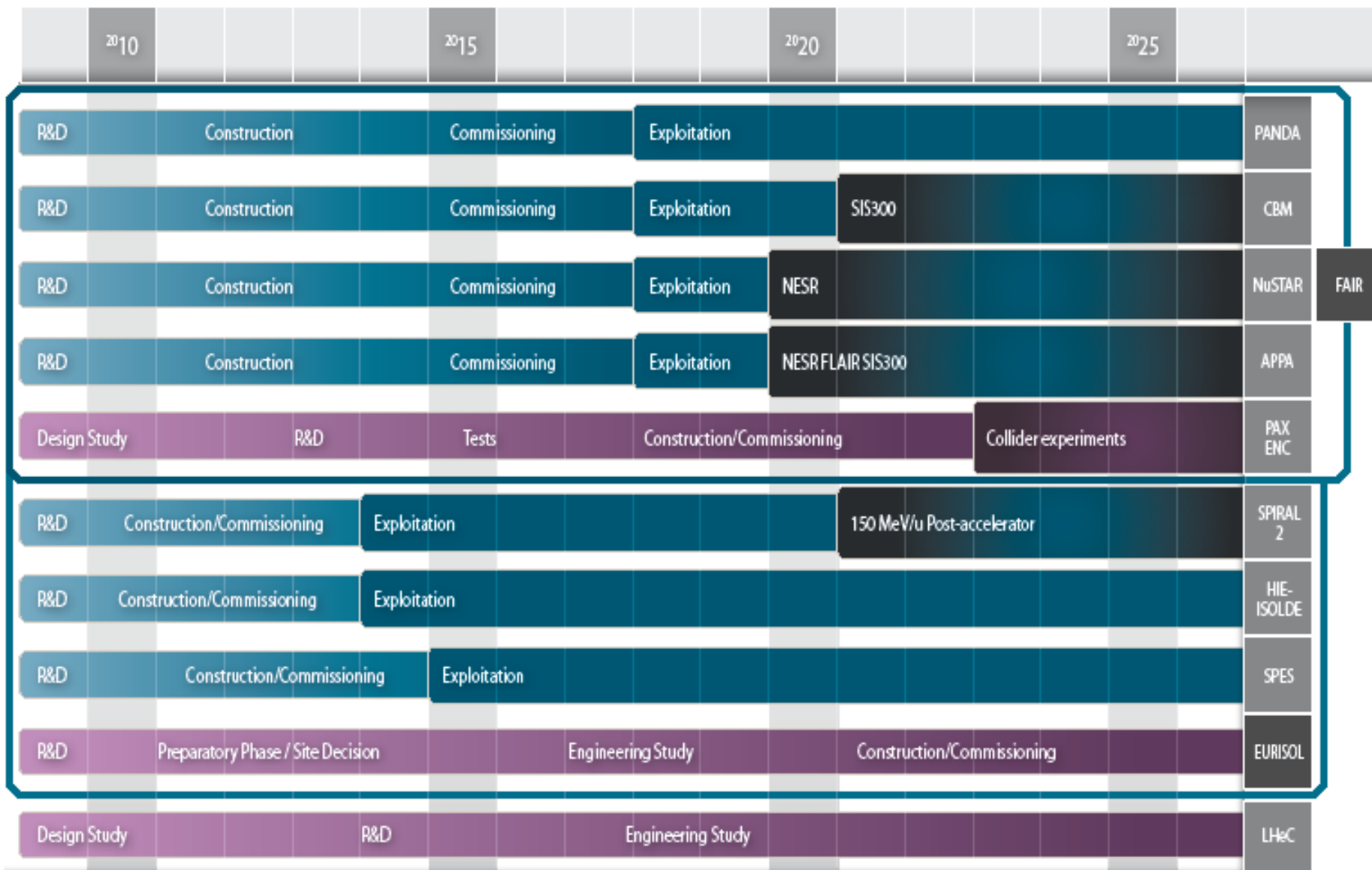
LRP2010 Recommendations

- Complete **ESFRI** Facilities
 - **FAIR** with PANDA, CBM, NuSTAR and APPA
 - **SPIRAL2** at GANIL including S3 and DESIR
- Perform Major **Upgrades**
 - **HIE-ISOLDE** at CERN
 - **SPES** at INFN-LNL
 - **AGATA**
 - **SC Linac** at GSI
- Support **ALICE** at CERN
 - Upgrade the nuclear beams and the detector to expand physics reach
- Support **Theory**
 - RI **ECT*** in Trento
 - Projects for advanced studies related to the experimental roadmap
 - Dedicated high-performance computing facilities
- Fully exploit **Existing Facilities**
 - **Lepton beam facilities** ELSA in Bonn, MAMI in Mainz, COMPASS at CERN, DAΦNE at INFN-LNF, and **hadron beam facilities** COSY at FZ Juelich and GSI in Darmstadt
 - **Heavy ion beam facilities** JYFL, KVI, GSI, GANIL, IPNO, ISOLDE, INFN-LNL and **INFN-LNS**
 - **Underground labs** in Europe such as LUNA at INFN Gran Sasso
 - **AD** at CERN & upgrade **ELENA**
 - **Smaller scale national and university labs** across Europe dedicated to nuclear structure & astrophysics experiments, fundamental interactions and nuclear applications

Recommendations cont'd

- Support Nuclear Physics **applications & education**
 - Secure and develop nuclear physics skills basis for current and future needs
 - Develop nuclear energy, medicine & security applications
 - Develop of novel sources, beams, targets & instrumentation
- Promote Planning for **Future Large-Scale Facilities**
 - **EURISOL** as RI in future updates of ESFRI list
 - Technical Design Study for intense radioactive beams at **ISOL@MYRRHA**
 - Technical Design Studies for **PAX** and **ENC** at FAIR
 - Technical Design Study for **LHeC** at CERN
 - Inclusion of nuclear physics programmes @ **ELI** and **ESS**

ROADMAP FOR NEW LARGE SCALE FACILITIES



Thank you very much for
your attention