



LIBPhys

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COST ACTION PROPOSAL

FUNDAMENTAL PARAMETERS FOR INTERACTIONS OF X-RAYS WITH MATTER

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Fundamental Parameters for Interaction of X-Rays with Matter



INTRODUCTION TO COST

COST ASSOCIATION – INTRODUCTION

▪ CO-operation in Science and Technology (COST)

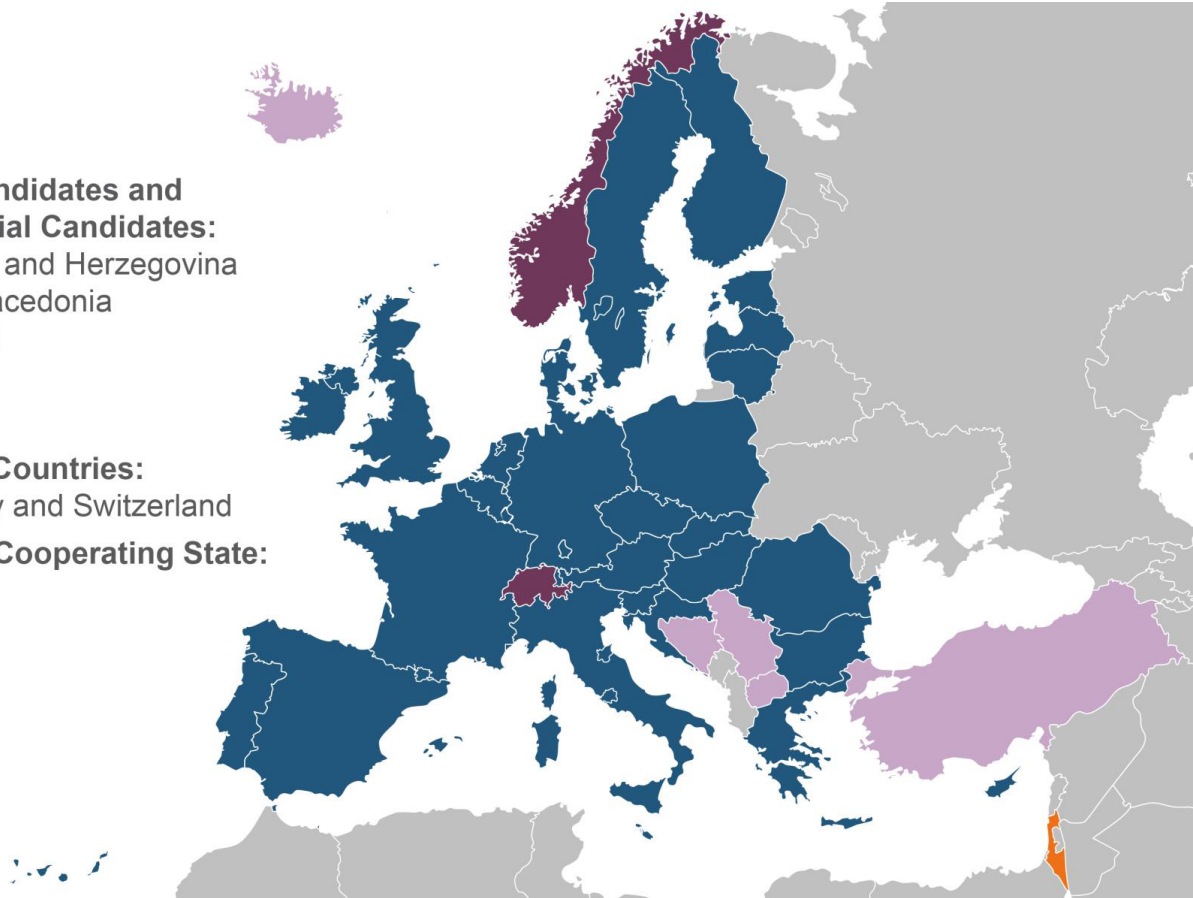
- A pan-European intergovernmental framework dedicated to **networking activities** for European investigators, enabling them to **jointly** develop their **own ideas** and **new initiatives** across **all scientific disciplines** through **trans-European coordination** of nationally funded research activities
- COST funding instrument is the **COST ACTION**

▪ COST ACTION

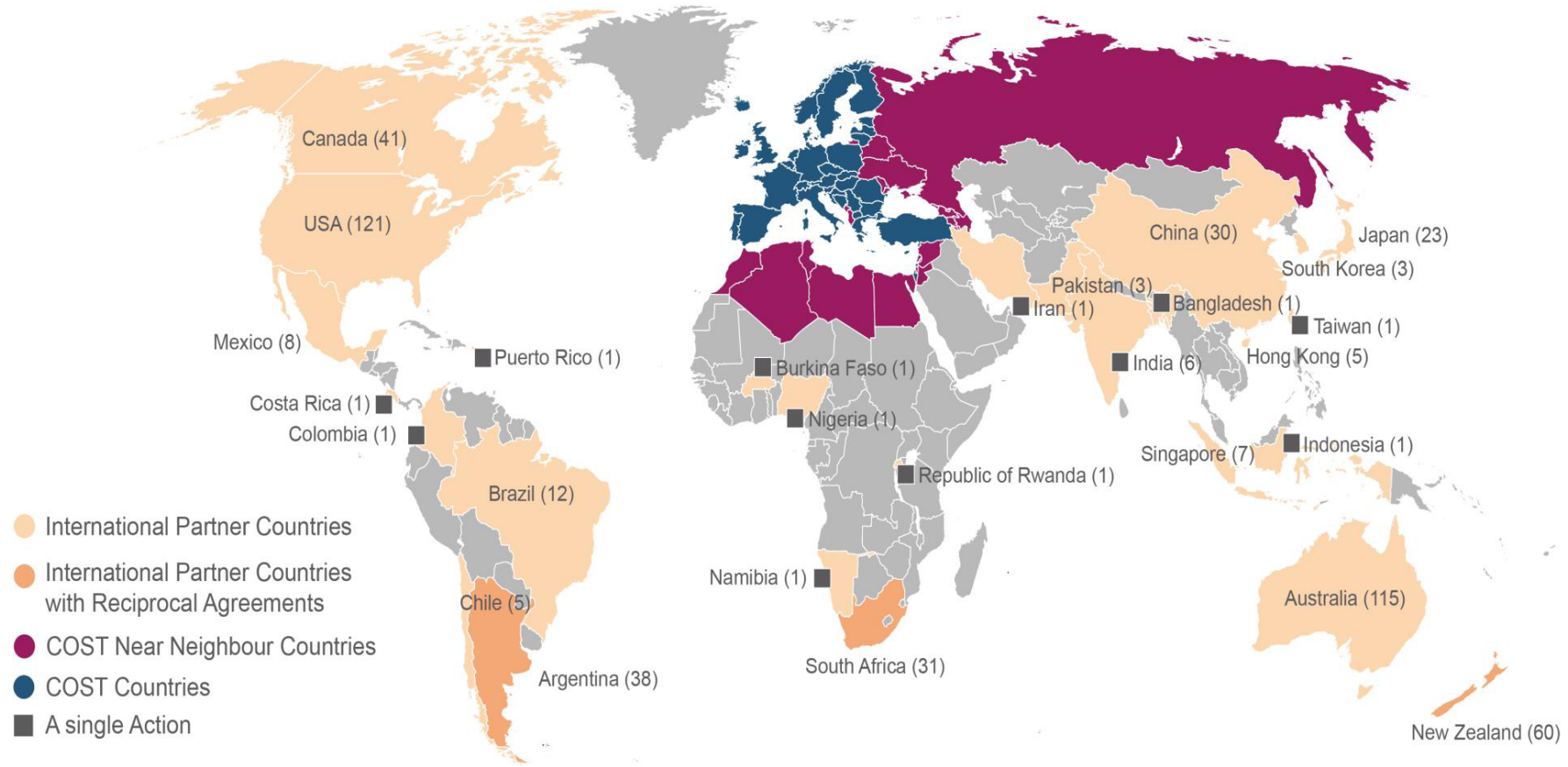
- A **scientific or technological network** with the duration of **four years** and a minimum participation of **five COST Member Countries**
- It is organised through a range of networking tools, and characterised by **bottom-up** and **open-access** principles
- An opportunity for **young investigators**; a step towards the **leadership in a scientific field**, a chance to create a network of **cutting-edge science**

COST – COUNTRIES

- EU 28
- EU Candidates and Potential Candidates:
Bosnia and Herzegovina
fYR Macedonia
Iceland
Serbia
Turkey
- Other Countries:
Norway and Switzerland
- COST Cooperating State:
Israel



COST – INTERNATIONAL PARTNERS



COST – GENERAL DESCRIPTION

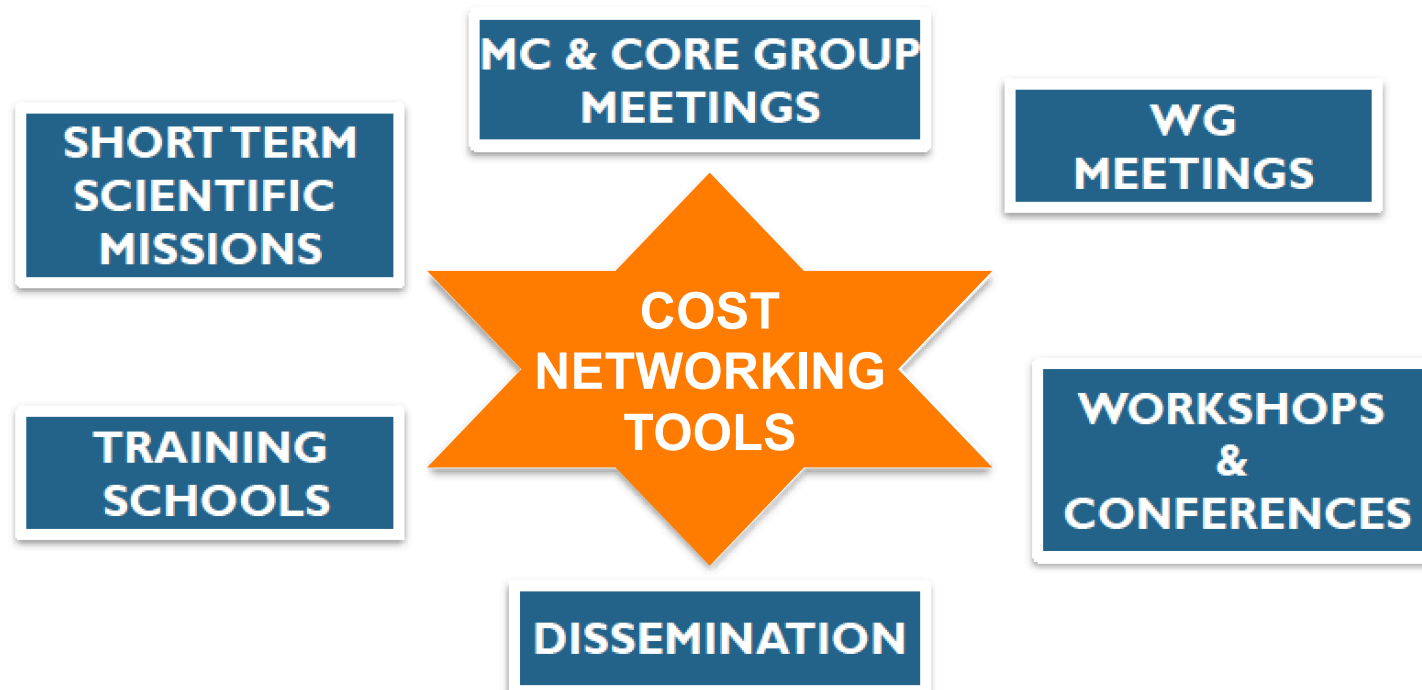


COST ACTION – FINANCIAL

- Memorandum of Understanding – **4 years duration**
- **Average Annual Budget 130 000 euros** (ref. 22 countries);
15% can be allocated to support the Action Management

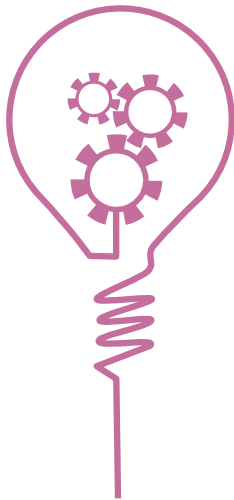
**COST DOES NOT FUND
HUMAN RESOURCES, CONSUMABLES AND EQUIPMENT**

COST ACTION – GENERAL DESCRIPTION



COST – NEW ACTIONS

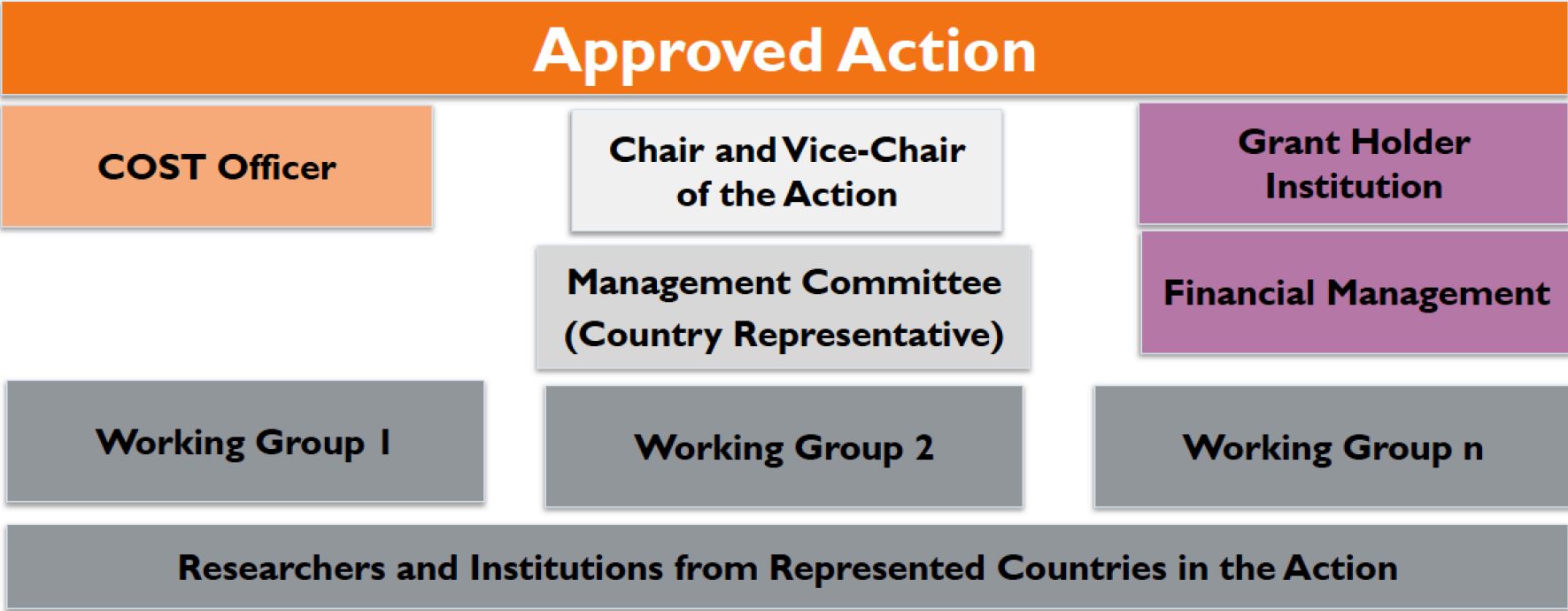
- An **Idea** on any Science and Technology topic that needs networking support
- At least **5 colleagues** from 5 different COST countries



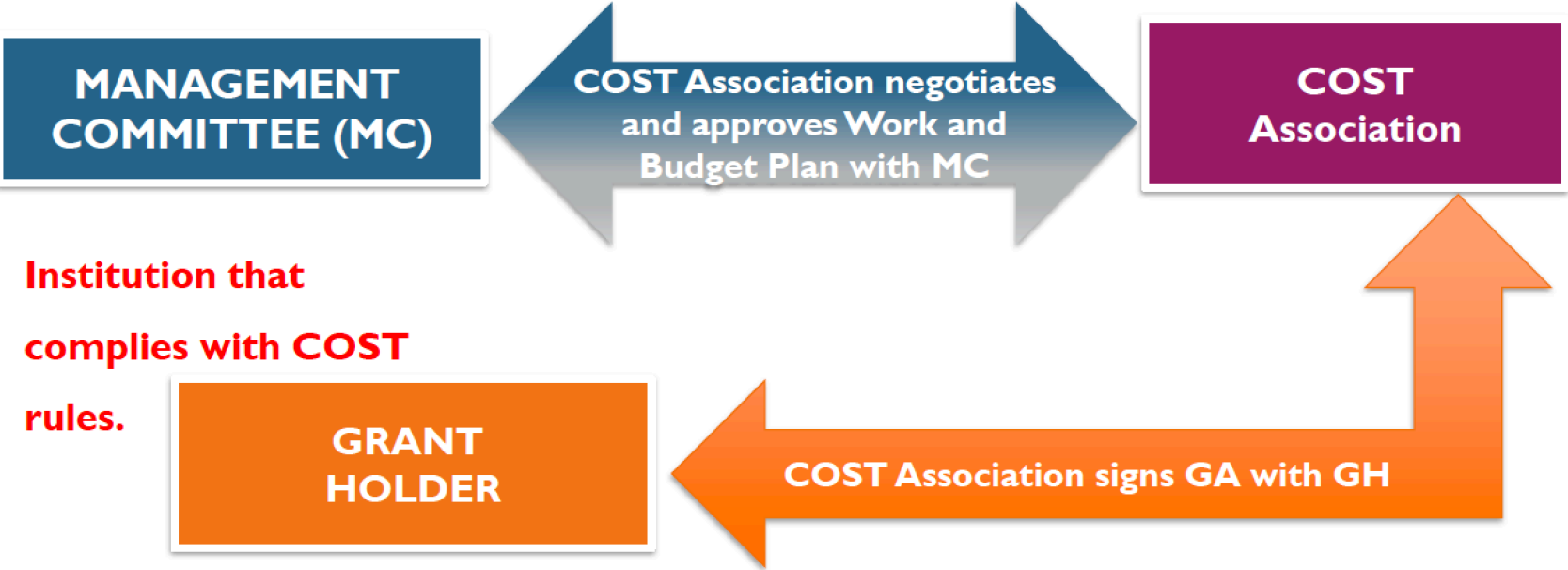
COST – NEW ACTIONS



COST – APPROVED ACTIONS



COST – FINANCIAL ASPECTS – GRANT AGREEMENT



COST – FINANCIAL ASPECTS

HOW DOES THE GRANT HOLDER REIMBURSE PARTICIPANTS?

- Reimbursement is done against actual participation
 - Following predefined maximum amounts (COST Vademecum)
 - Travel Expenses
 - All participants in meetings
 - Trainers in Training Schools
 - Travel, accommodation, meals and local transport
 - Fixed Grant
 - All participants in STSM
 - Trainees in Training Schools

COST – KEY FEATURES

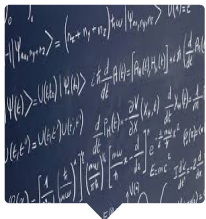
- Networking opportunities for researchers
- COST Actions aim primarily at sharing knowledge
- Open to global cooperation on the basis of mutual interest
- Open to all science and technology fields
- Trans- disciplinary is particularly valued
- Capacity building
- Lean administration
- Easy implementation
- Easy procedures for joining running Actions



FUNDAMENTAL PARAMETERS FOR INTERACTION OF X-RAYS WITH MATTER

COST PROPOSAL

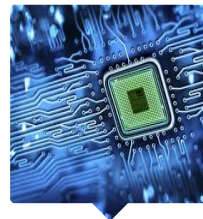
FP X Rays APPLICATIONS



Fundamental
Physics



Astrophysics



Nano and
Microelectronics



Biomedical



Geological
Sciences



Cultural
Heritage



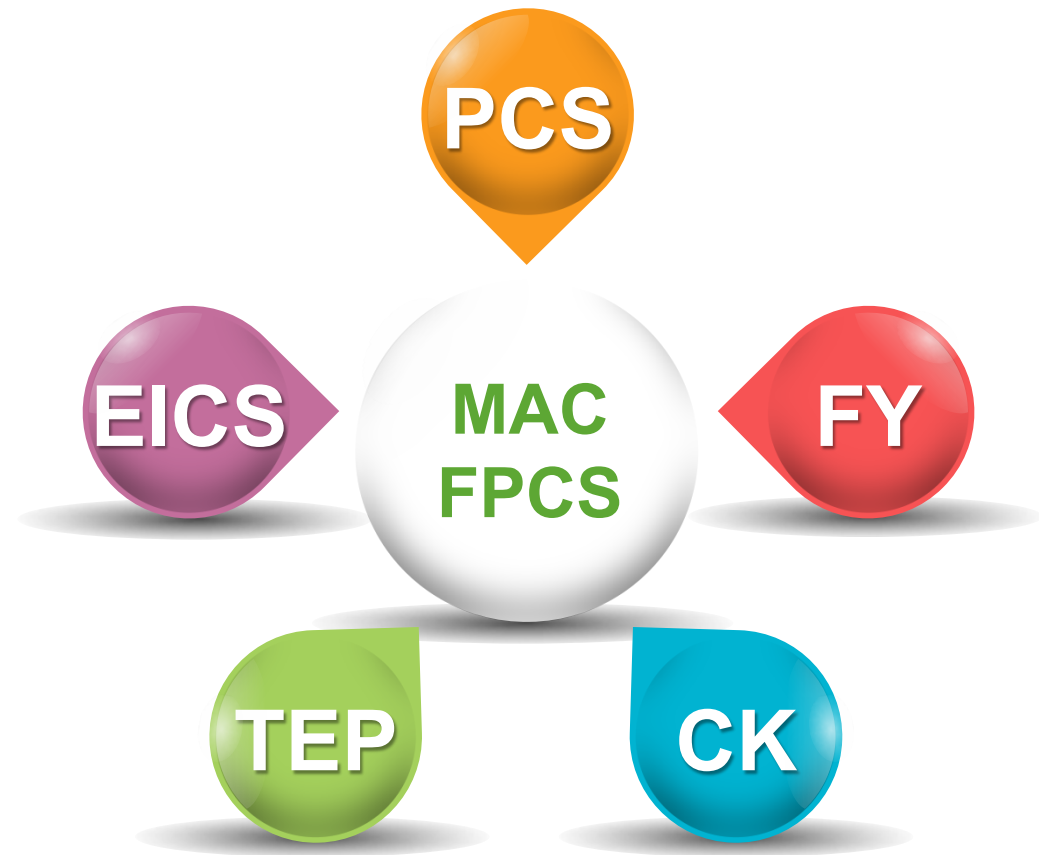
Environmental




Law
Enforcement

RELEVANT FPXRays

- MAC** MASS ATTENUATION COEFFICIENTS
- FPCS** FLUORESCENCE PRODUCTION CROSS SECTIONS
- PCS** PHOTOIONISATION CROSS SECTIONS
- FY** FLUORESCENCE YIELDS
- CK** COSTER-KRONIG FACTORS
- TEP** TRANSITION ENERGY AND PROBABILITIES
- EICS** EXCITATION AND IONIZATION CROSS SECTIONS BY ELECTRON IMPACT



WHY THIS COST ACTION?

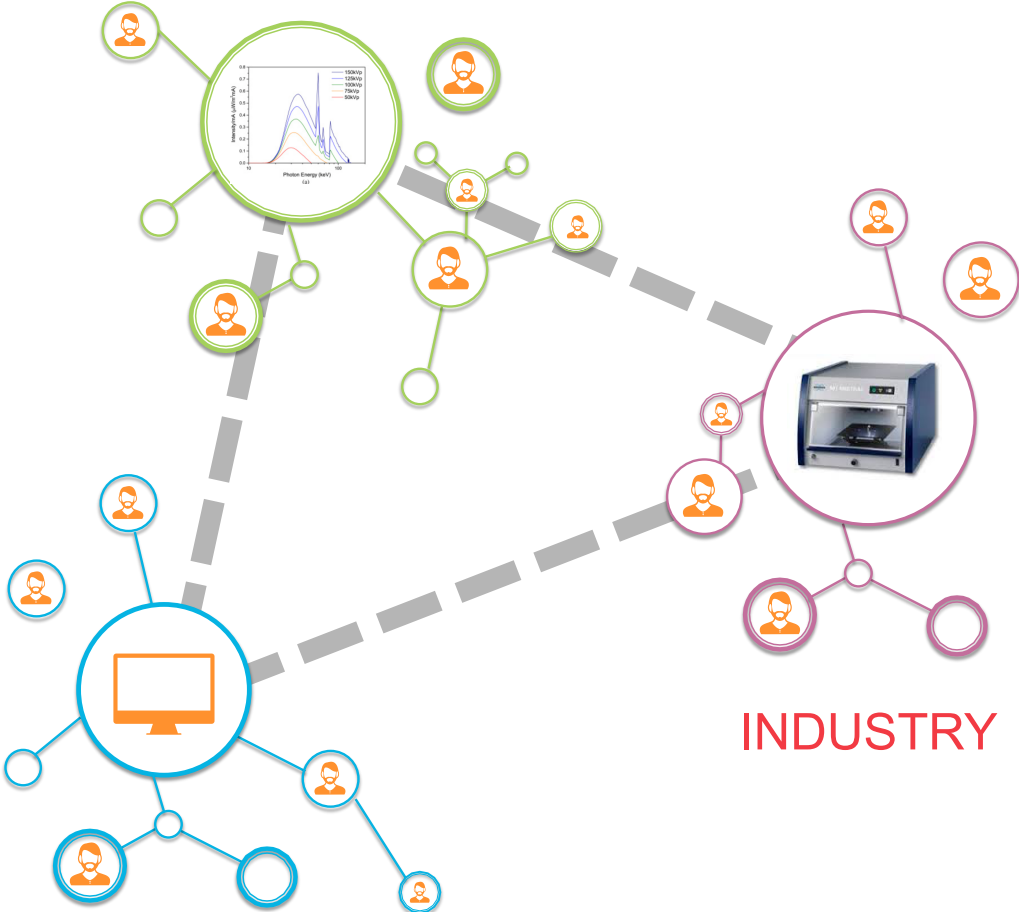
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- The lack of reliable Fundamental Parameters (FP) data with low associated uncertainties constitutes a serious limitation to the progress of X-ray spectrometry and related technologies
 - Large discrepancies have been reported in wide ranges of elements and X-ray energies in the available databases
 - The worldwide sales of X-ray spectrometry related analytical equipment is estimated at about 1 billion euros – more than 5000 annual units
 - There is a need to establish European inter- and intra-networks between the theoretical, experimental groups and companies

ACTUAL SITUATION

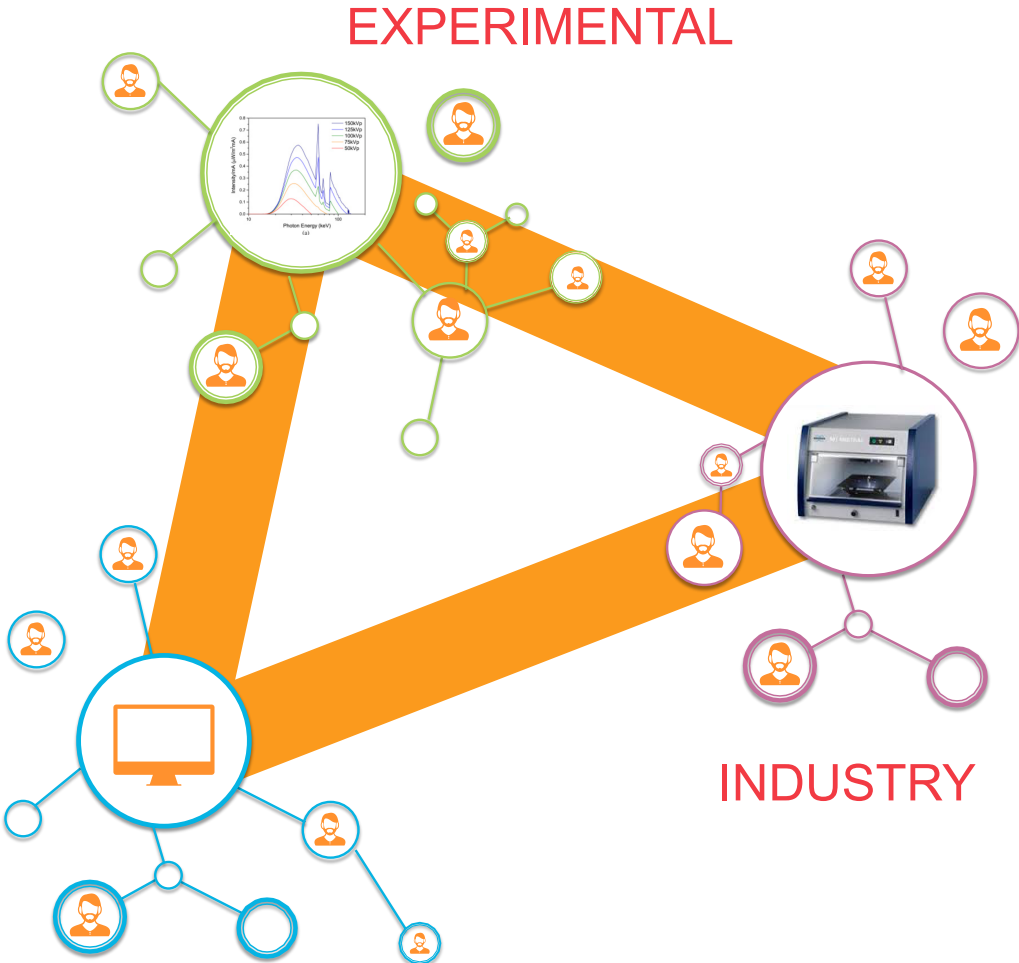
THEORY

EXPERIMENTAL


INDUSTRY




DESIRABLE SITUATION




FPXRays COST PROPOSAL – MAIN GOALS




Provide a deeper understanding of the structure and dynamics of atoms and ions for scientific applications in several fields



Provide a comprehensive database of FP, indispensable to enhance the quantitative reliability of X-ray spectrometry industrial applications



Integration at an European level of the experimental installations and the combined experience of many theoretical groups



Foster the collaboration between the different communities that study and use X-rays

INNOVATION IN TACKLING THE CHALLENGE

Measurement of available X-ray related fundamental parameters with **improved uncertainties**, and of X-ray related fundamental parameters that have been **never measured**

Calculation for **the first time** of X-ray related fundamental parameters that are **not easily measured**

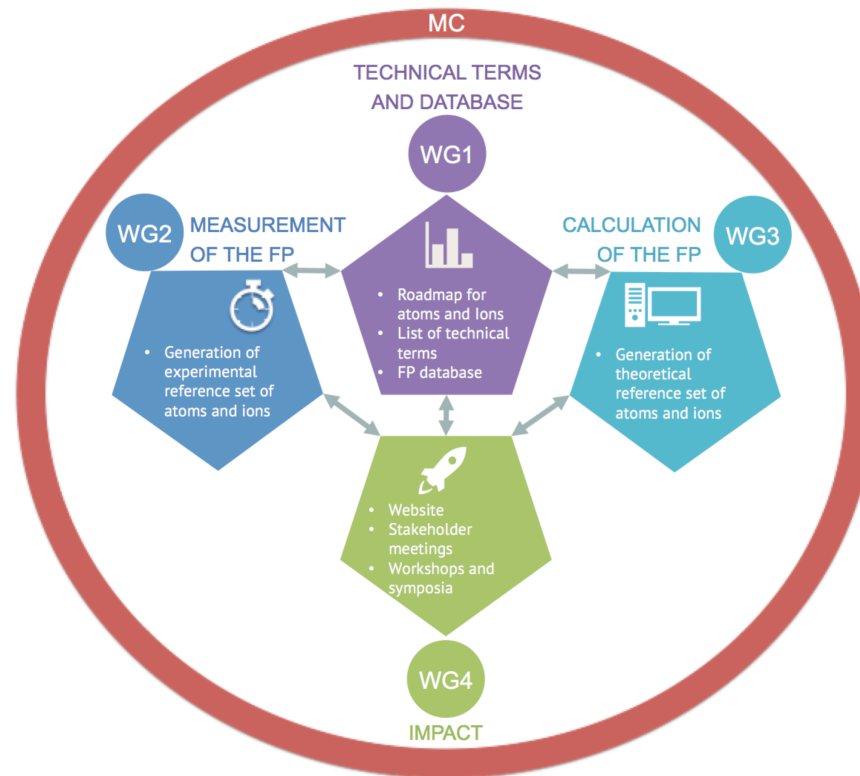
Validation of FP values by involving independent determination methods or sites

Definition and clarification of the usage of X-ray related technical terms

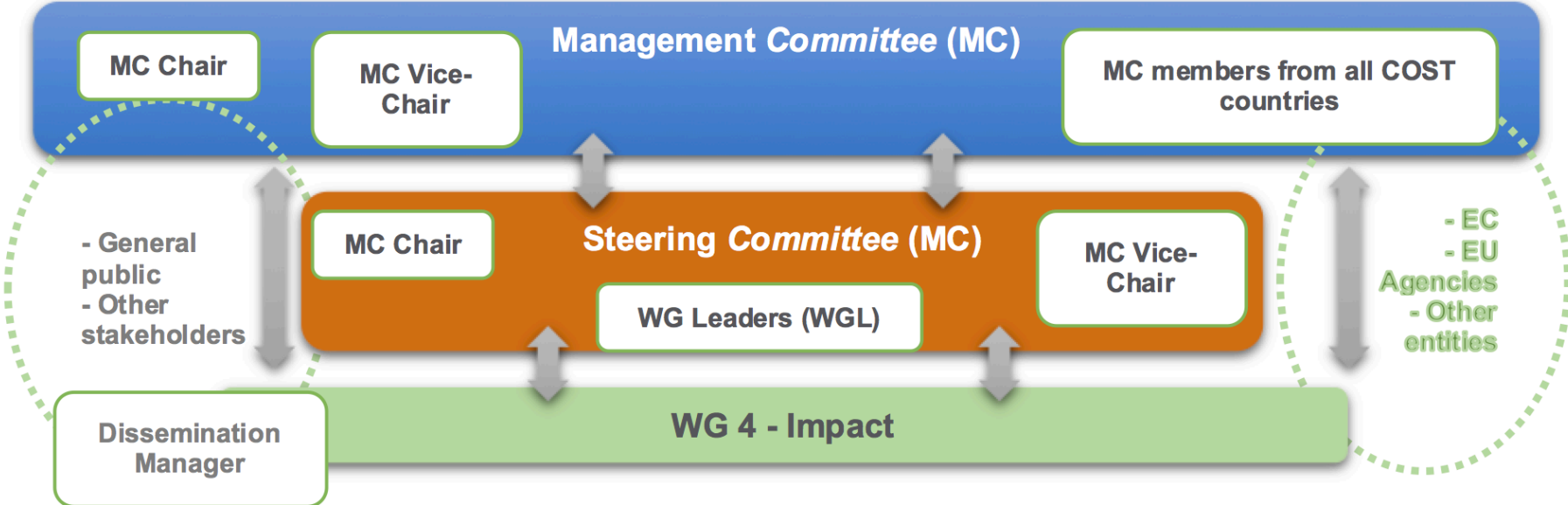
Creation of an European standardized X-ray related FP database in collaboration with national metrology institutes

Development of X-ray spectrometers with **improved accuracy**

IMPLEMENTATION



MANAGEMENT STRUCTURES



PROPOSERS

Portugal

José Paulo Santos

José Marques

Luisa Carvalho

Sofia Pessanha



Belgium

Michel Godefroid



France

Paul Indelicato

Marie-Christine Lepy



Germany

Thomas Stoeckler

Burkhard Beckhoff

Stephan Fritzsche



Greece

Manolis Benos



Lithuania

Gediminas Gaigalas



Poland

Marek Pajek



Sweden

Per Jonsson

Jorgen Ekman



United Kingdom

Christopher Jeynes



NETWORK OF PURPOSERS – FEATURES

COST Inclusiveness target countries

- 33%

Number of Proposers

- 15

Gender Distribution of Proposers

- 80% Males
- 20% Females

Average Number of years elapsed since PhD graduation of Proposers

- 23.9

Core Expertise of Proposers

- 93.3% Physical Sciences
- 6.7% Materials engineering

Institutional distribution

- 94.9% Higher Education & Associated Organisations
- 5.1% Government Organizations

HCI 2018 – LISBON – CAPARICA



Wellcome

To Lisbon

◆ THANK YOU FOR YOUR ATTENTION