

# Brainstorming meeting

CERN, 25 June 2012

*“A personal view”*

**Alberto Del Guerra (\*)**

Department of Physics, University of Pisa and  
INFN, Pisa, Italy

alberto.delguerra@df.unipi.it

<http://www.df.unipi.it/~fiig/>

# Summary

- **Necessities for the “community” in Europe**
- **Possible Implementations**
- **The LEIR proposed solution**
  - **Advantages**
  - **Applications**
- **Conclusions**

# **Necessities for the “community” in Europe**

- **Coordination of research**
- **Sinergy of research**
- **Structure support**
- **Excellence in science and Better society**  
➔ **Horizon 2020**

# Possible Implementations

- **FUNDING and Specific Research Calls at each country Level**
  - **An example: Italy**
    - **Funding very limited**
    - **Research calls not available**
- **FUNDING and Specific research calls at European level**
  - **FP7 had calls available within HEALTH, but the output has been very limited**
  - **FP8 will have specific calls with a specific target, basically more cost effective, e.g. Horizon 2020**

# **The LEIR proposed solution/1**

## **Advantages**

- **Site coordination**
- **Support from a well established structure**
- **Well trained scientific approach**
- **Well trained collaborations system at pan-European and trans-European level**
- **Well aligned with the competence and the core business of CERN (i.e., accelerators, dosimetry, detectors,...)**

# The LEIR proposed solution/2

## Applications

- **Beam handling (New techniques of delivery , e.g. Advances IMPT)**
- **Beam monitor (New detectors for real time 2-D monitoring system)**
- **Beam dosimetry ( New detectors and techniques for in vivo hadron dosimetry) :**
  - **PET dosimetry**
  - **Prompt Photons**
  - **Bragg peak protons production**
  - **Proton Computed Tomography**
  - **and more...**
- **Radiobiology under controlled conditions**

# The LEIR proposed solution/3

## Research Strategy

- **Possibility to move forward from the initial study**
  - **→ to proof of principle →**
  - **→ to industrial pre-prototype →**
  
  - ← (Industrial partnership) →**
  
  - **→ production and distribution and clinical use of the new device**

# **My request: Detectors and Systems testing for “in vivo-in beam” hadron dosimetry**

- **Pencil beam  
and Collimated beam (variable radius)**
- **Variable intensity**
  - from 1/50 of the clinical dose rate to 5 times more
- **Variable energy**
- **Variable nuclei (from p to Carbon and beyond)**
- **Radioactive beam of C-11**



# The actual level of “Education and Training” of the Medical Physics Expert at European Level/1



EURATOM 97/43  
*Versione ufficiale in lingua inglese*



BSS Recast Directive  
*Draft 2010*

## **Art.2 – Definitions**

**Medical Physics Expert: an expert in radiation physics or radiation technology applied to exposure**, within the scope of this Directive, whose **training and competence** to act is recognized by the competent authorities; and who, as appropriate, **acts or gives advice on patient dosimetry, on the development and use of complex techniques and equipment, on optimization, on quality assurance, including quality control**, and on other matters relating to radiation protection, concerning exposure within the scope of this Directive.

## **Art.20 – Medical Physics Expert**

1. Within the healthcare environment, the Medical Physics Expert shall, as appropriate, act or give specialist advice on matters relating to radiation physics applied to medical exposure.
  2. Depending on the medical radiological practice, the Medical Physics Expert shall take responsibility for dosimetry, including physical measurements related to the evaluation of the dose delivered to the patient and contribute in particular to the following:
    - the optimisation of radiation protection of patients and other individuals submitted to medical exposure, including the establishment and the use of diagnostic reference levels;
    - the definition and performance of quality assurance tests of the medical radiological equipment;
    - the preparation of technical specifications for medical radiological equipment and installation design;
    - the surveillance of the medical radiological installations with regard to radiation protection;
    - the selection of equipment required to perform radiation protection measurements and give advice on medical radiological equipment;
    - the training of practitioners and other staff in relevant aspects of radiation protection.
- Where appropriate, the task of the Medical Physics Expert can be carried out by a Medical Physics Service.

# The actual level of “Education and Training” of the Medical Physics Expert at European Level/2

To support the harmonization of MPE education in the Member States, aiming at easier mutual recognition and improved mobility of MPE...



<http://portal.ucm.es/web/medical-physics-expert-project/inicio>

## Guidelines on Medical Physics Expert

- proposal for detailed education and recognition scheme to help in the European harmonization of MPE,
- proposal for detailed "standard" syllabus for the education and training of M
- proposal on the recommended number of MPE for the different practices.

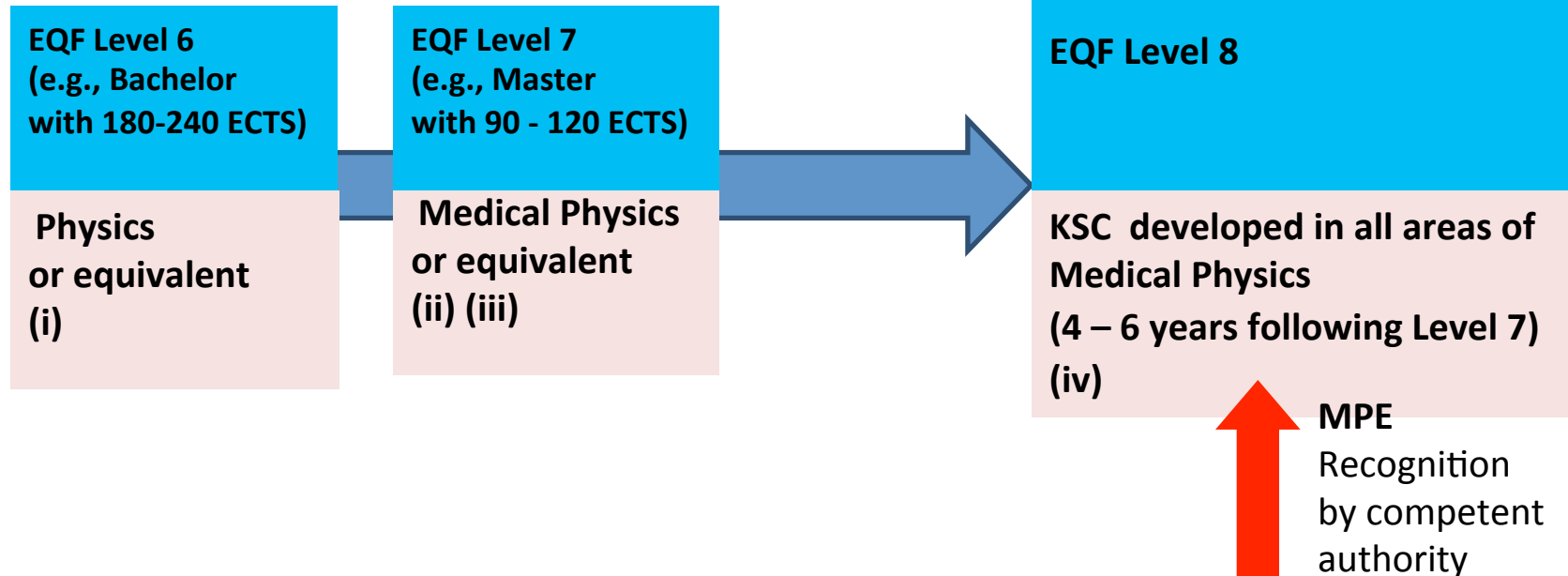


# The actual level of “Education and Training” of the Medical Physics Expert at European Level/3

## Qualification Framework for the Medical Physicist

EQF = European Qualifications Framework

KSC = Knowledge, Skills, Competences



(i) ‘Equivalent’ here meaning EQF Level 6 with a high level of physics and mathematics content.

(ii) ‘Equivalent’ here meaning EQF Level 7 with a high level of physics and mathematics content, plus further additional academic education in the Core KSC of Medical Physics (as specified in this document).

(iii) The entry level for the MP has been set at EQF Level 7 because to provide effective, safe and economical practice based on current best evidence, the MP requires highly specialized knowledge, critical awareness of knowledge issues in the field, specialized problem-solving skills, ability to manage work contexts that are complex and ability to review the performance of teams.

(iv) Accredited credentialing training programme for on-the-job development of the KSC specific to the areas of Medical Physics. This training should ideally take the form of a Residency.

# CONCLUSIONS

- **Go-Ahead !!**
  - Installation
  - Call for proposals
  - Evaluation, approval and technical support
- It could also help towards a “Free Movement” in Europe → “Mutual recognition and mobility of the Medical Physicist”, so as to receive support from the Medical Physics European scientific societies.