



# PARTNER

## Particle Training Network for European Radiotherapy

### TILL BÖHLEN

#### Biography:

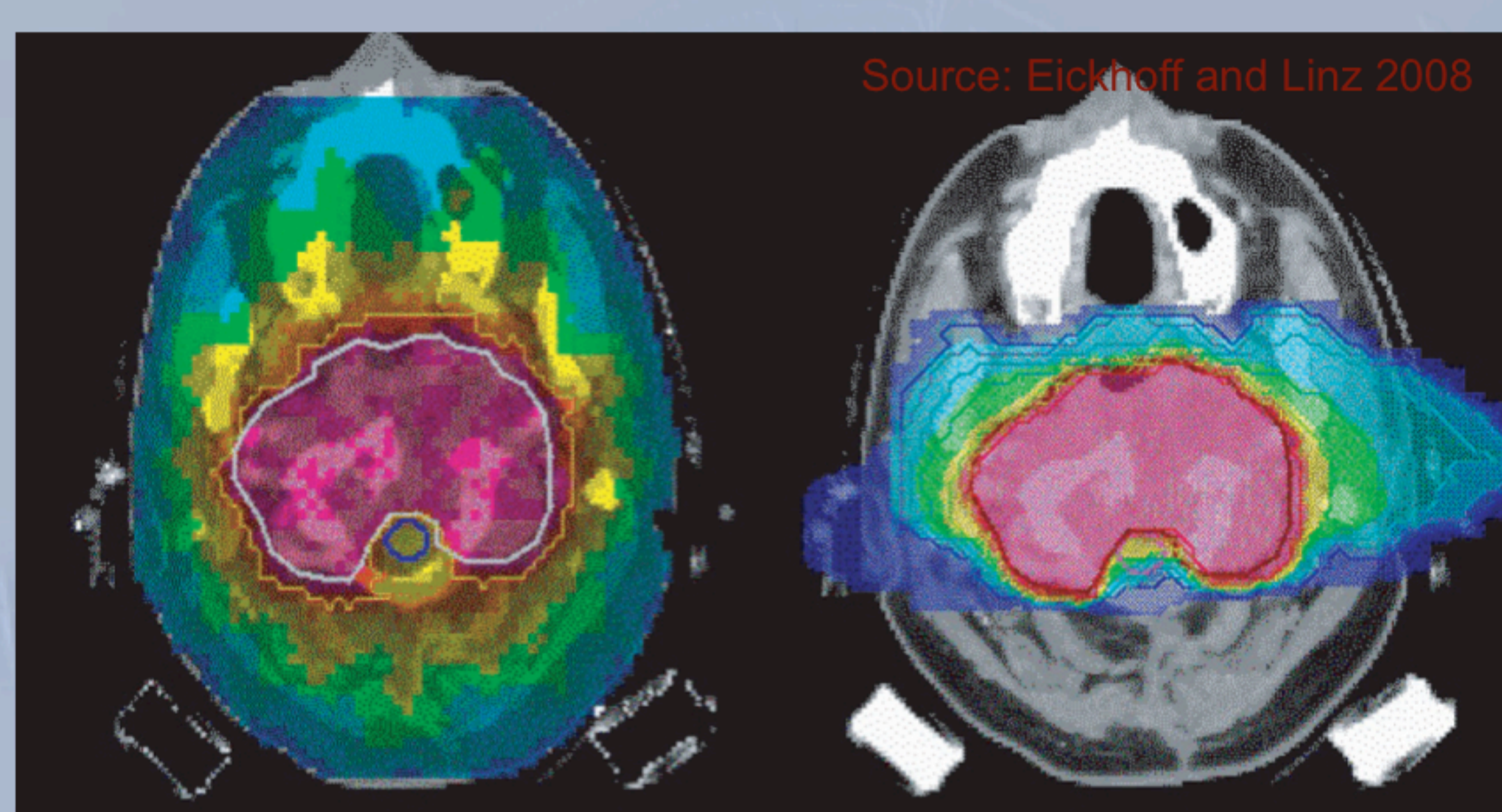
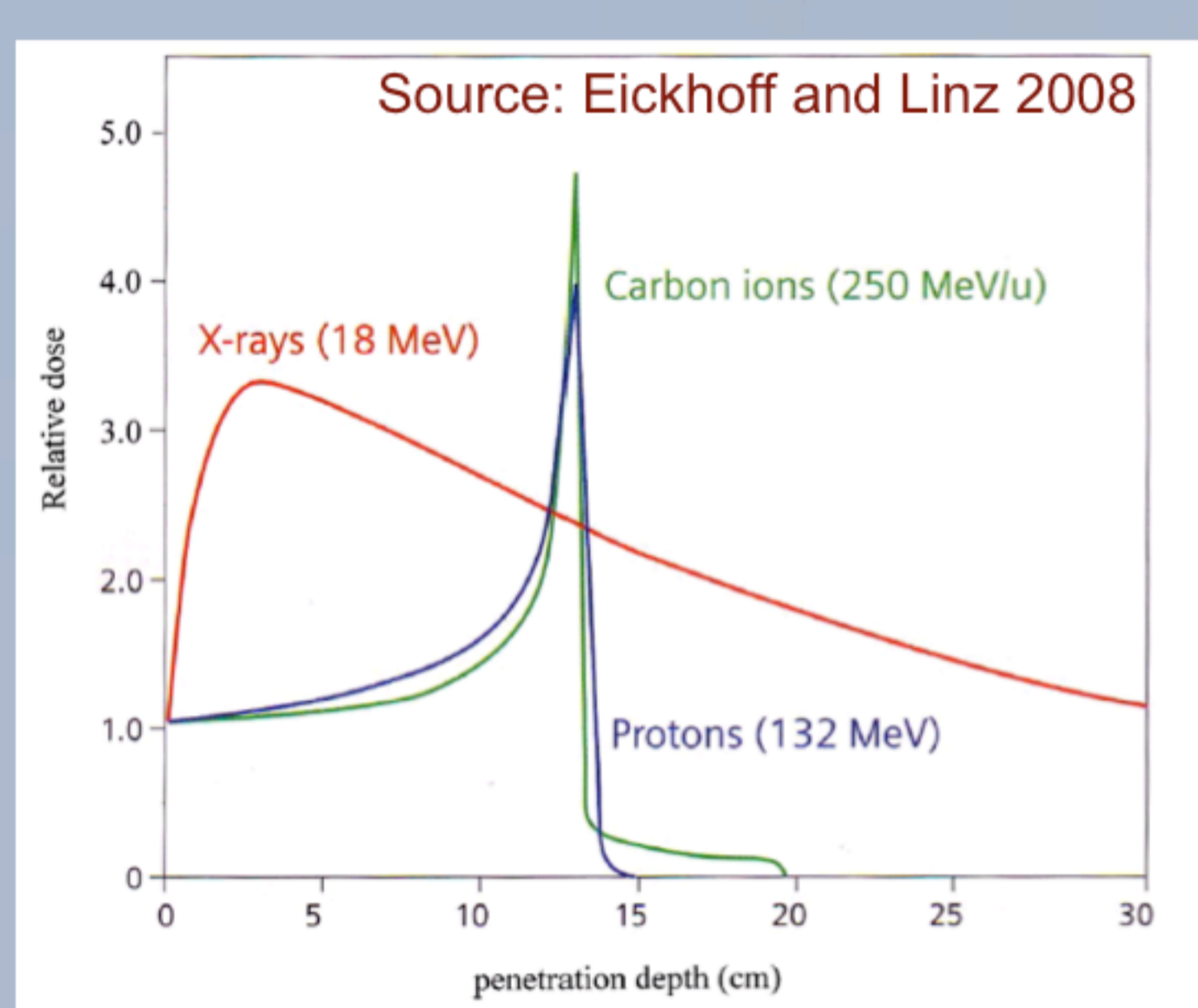
Age: 27  
 Nationality: German  
 Education:  
 Bachelor and Master of Science in Physics at  
 Technical University Darmstadt



Marie Curie Fellow since: Dec. 2008

#### Description of work - general:

Tumours can be targeted with light ion beams very efficiently while sparing healthy tissue. This is due to the inverse depth-dose profile of ions. This form of treatment is called hadron therapy.



Depth-dose curve of photons, protons, and carbon ions.

Isodose for a tumour treatment with IMRT (photons) and carbon ions.

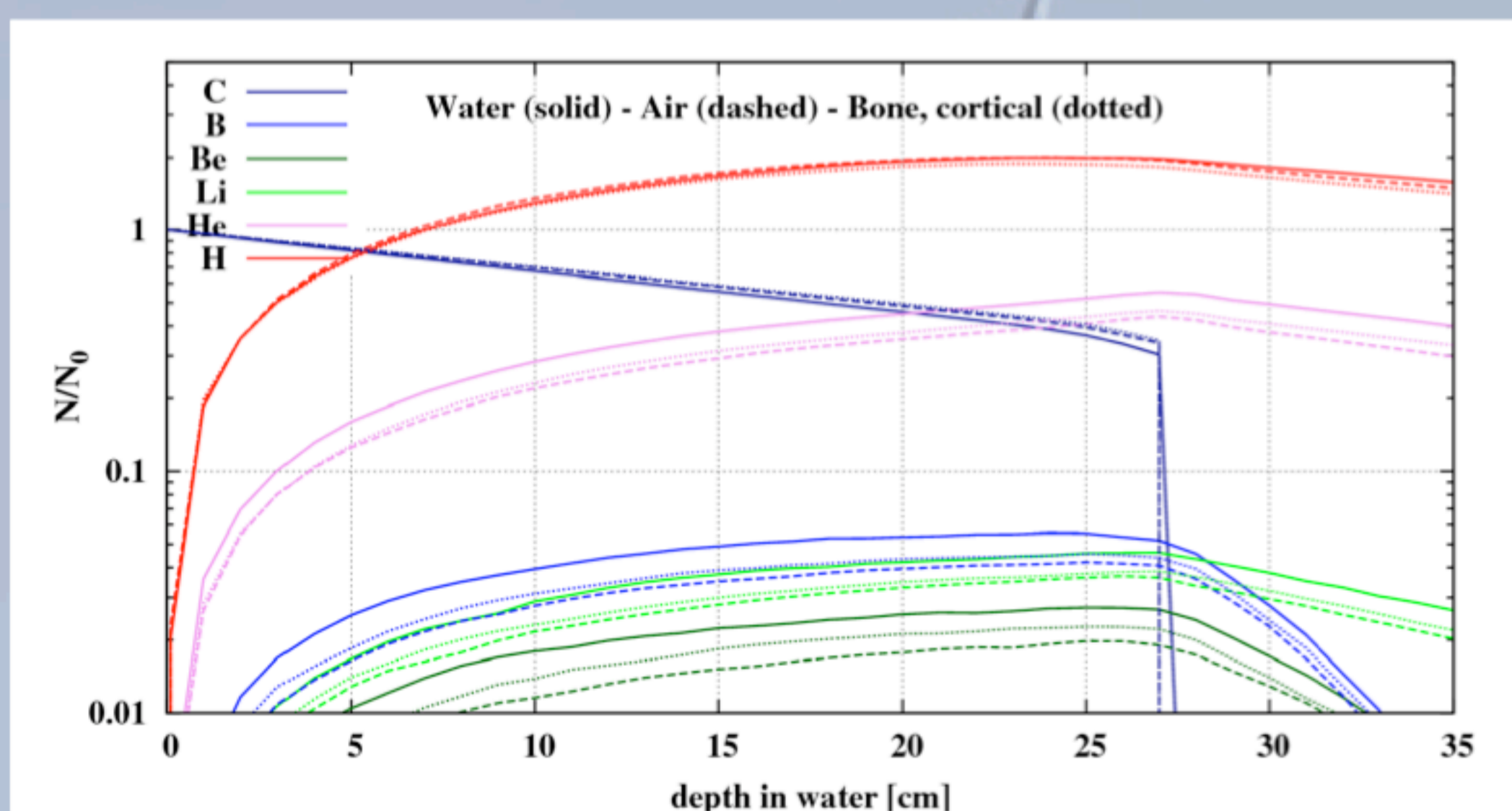
Monte Carlo particle transport systems – as developed here at CERN – are a valuable tool for simulating therapeutic ion beams in human tissues.



Physics models of the Monte Carlo codes have to be validated and improved to respond to the high demand in precision for a very selected region of projectile-target combinations and energies relevant for ion therapy.

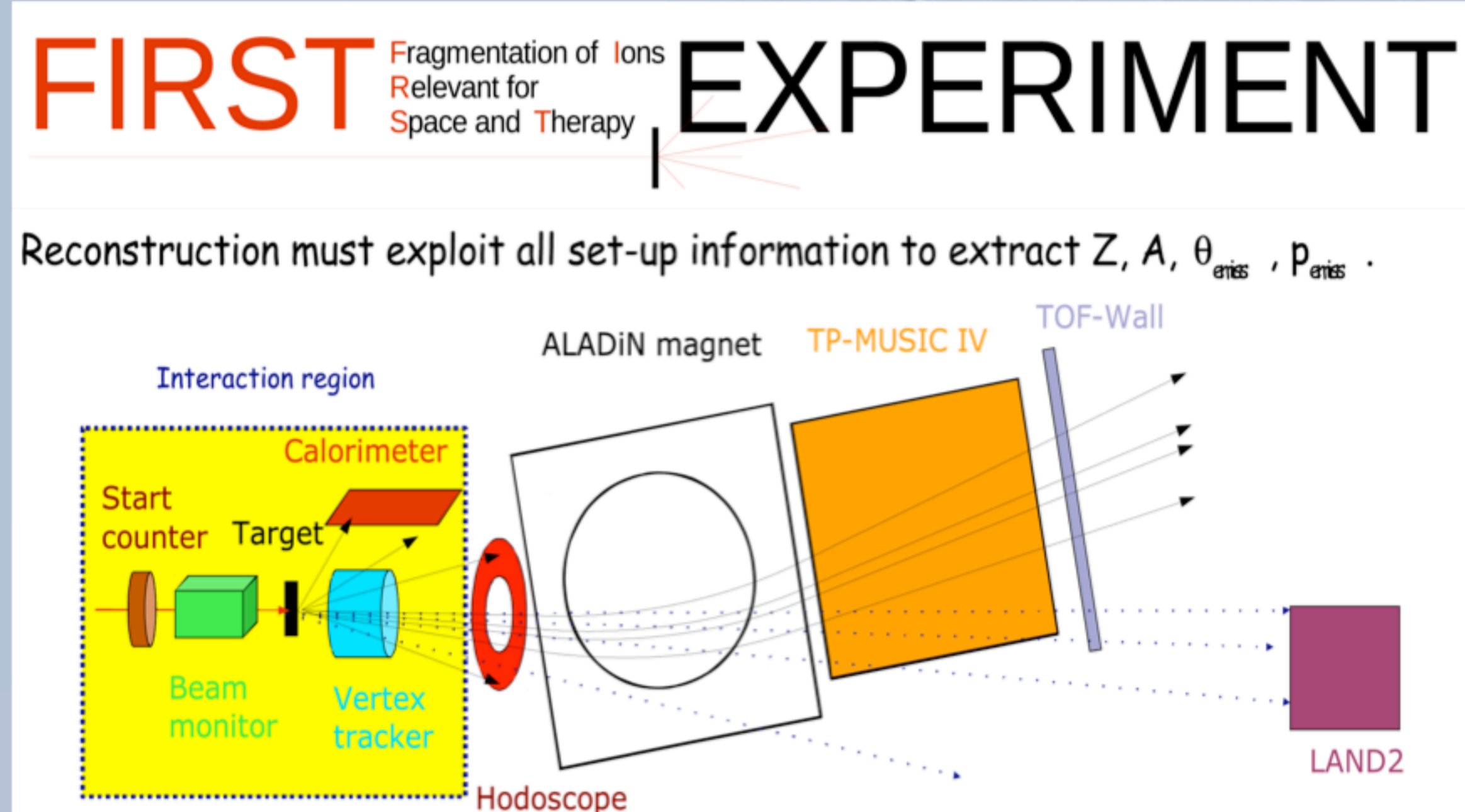
#### Description of work - specific:

#### Benchmarking of Monte Carlo codes:



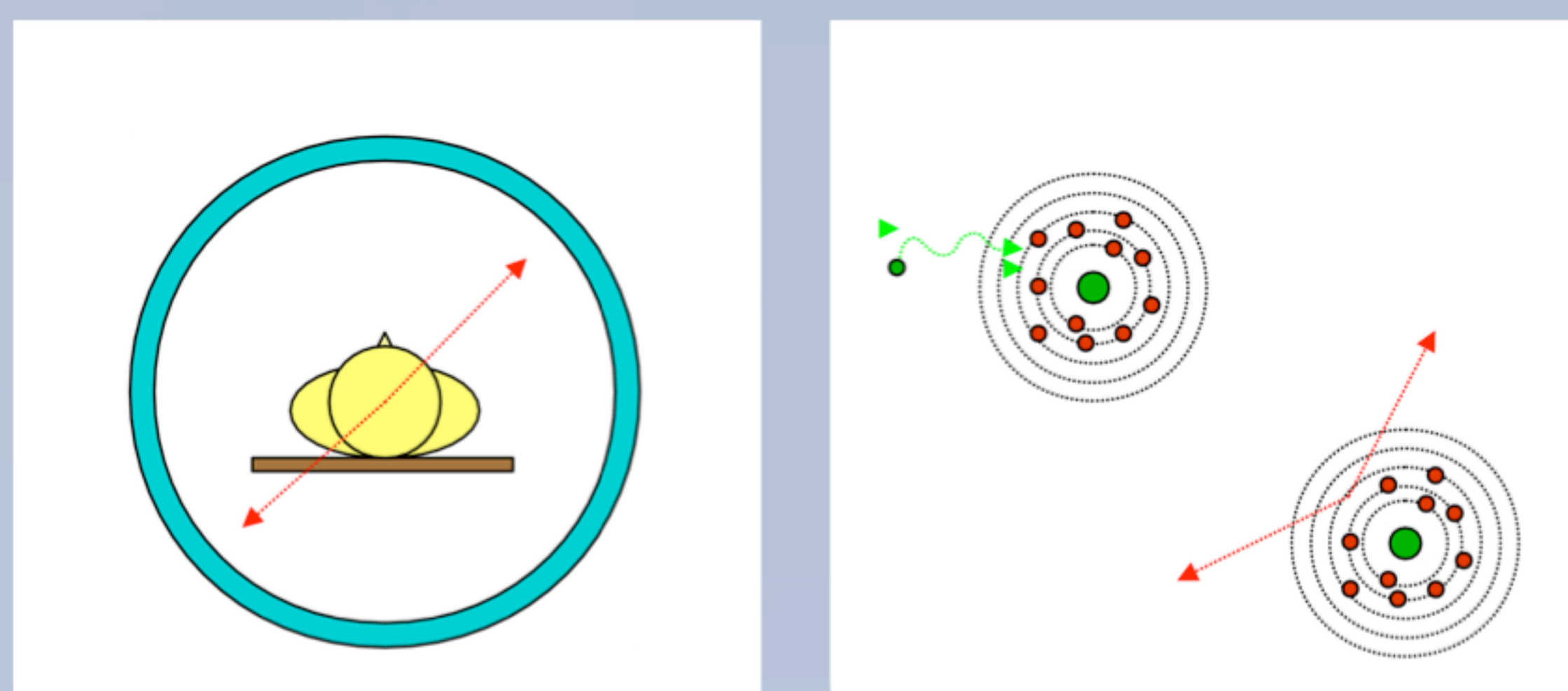
A benchmark for nuclear models was done. Differences of cross sections of ~10% and more were found. Further, validation studies are ongoing.

#### High precision measurements of nuclear cross sections:



The FIRST collaboration prepares an experiment to obtain high-quality cross section data for hadron therapy which will help to benchmark and improve nuclear models.

#### Improving Physics Models for hadron therapy:



PET can be used to do dose monitoring for hadron therapy. A model describing acollinearity of the annihilation photons is being developed.

### VASSILIKI KANELLOPOULOS

#### Biography:

Age: 35  
 Nationality: German/Greek  
 Education:  
 Diploma in Physics at University of Tübingen  
 Diploma thesis in theoretical atomic physics at Technical University Munich  
 Research at TU Munich & Cornell University  
 Study of Medical Physics at TU Kaiserslautern



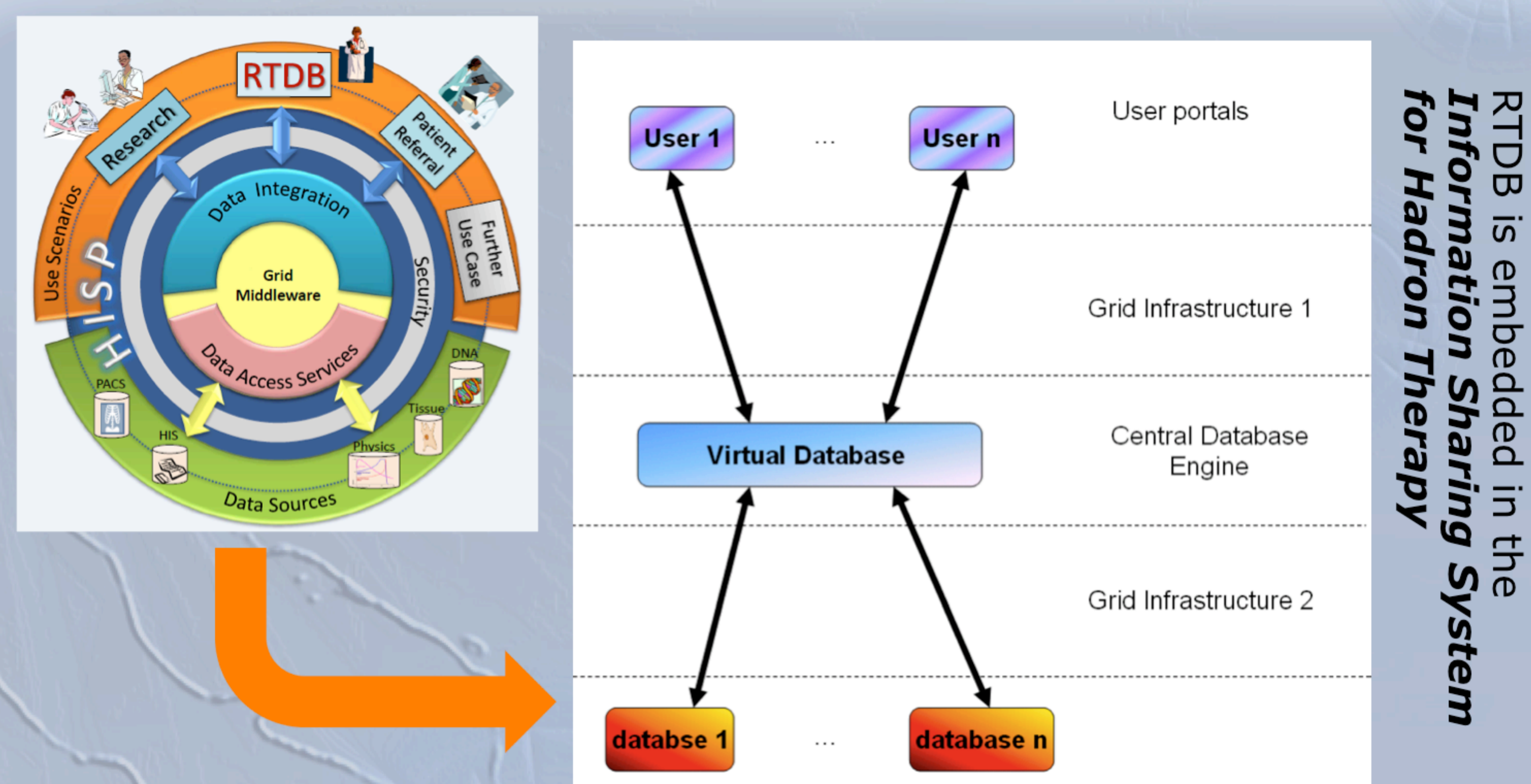
Experience in medical software engineering:  
Co-Founder of NCSO med GmbH - Development of a information system for Radiotherapy

Marie Curie Fellow since: April 2009  
PhD student at the University of Surrey since October 2009

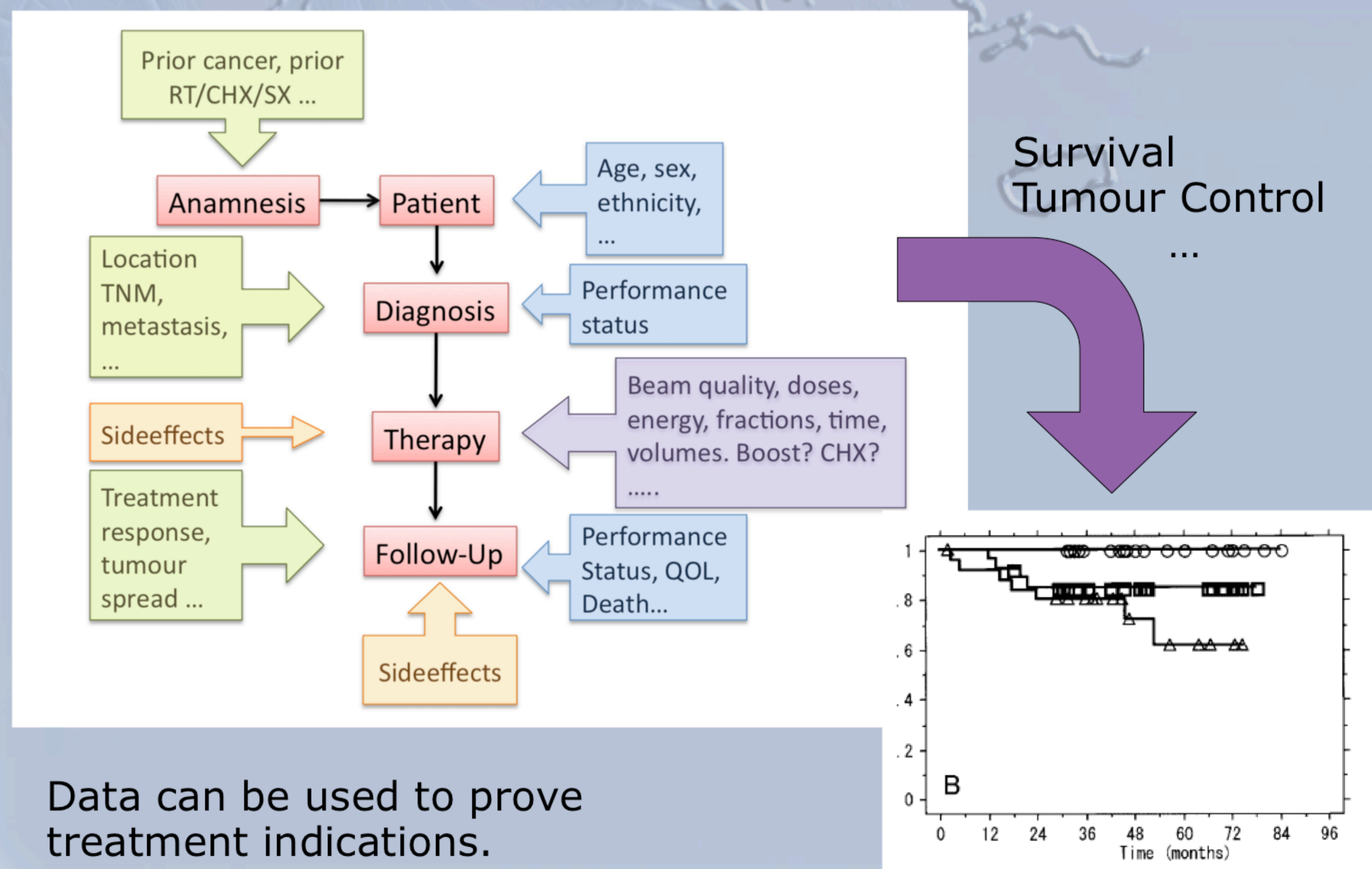
#### Project: Rare Tumour Database.

20% of all cancer cases are rare cancers. Their treatment experience is often limited, which makes it difficult to form evidence-based treatment guidelines. In particular this applies to the increasing number of patients with rare tumours which will be treated in the emerging European hadron therapy centers. There is an urgent need to collect the information of all treated patients in a common research database: 1) To facilitate the analysis of best practices and 2) to provide the necessary statistics treating those rare tumours.

#### Description of work:



#### Identification of relevant medical and biological data – Development of a prediction model for therapy outcome – Validation of the model



Data can be used to prove treatment indications.

