

# The West-German Proton Therapy Center Essen

## Facility Start up

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West-German Proton Therapy Center Essen



# Why protons?

We believe it's better for many of our patients.

- Improvement of outcome through dose escalation
- Shorter treatment times through hypofractionation
- Lower toxicity through lower dose to normal tissue

Proton therapy provides important research opportunities

- Catchment area for patients
- Oncology and radiation oncology expertise
- Interdisciplinary cooperations
  - e.g. chemotherapy, surgery, radiology
- Cooperation with medical partners who could refer patients
  - e.g. hospitals, external specialists
- Capacities for in-patients
- Accommodation for walk in patient

What do you want to treat?

Do your cooperation partners have special interests?

How many patients you want to treat?

Research projects?

- How many Treatment rooms?
- Gantry or FixBeam
- Pencil Beam Scanning, Uniform Scanning or Double Scattering or everything ?
- Out-room imaging?
- Patient transport system?
- CT and MRI
- etc.

# The University Hospital of Essen

- 1276 beds, 27 clinics, 20 institutes
- 5.500 employees
- 50.000 stationary patients per year
- 110.000 ambulatory patients per year
- Three focus areas:  
**Heart and Circulation, Oncology, Transplantation (HOT)**



# Reasons for a Proton Therapy Center at the University Hospital of Essen

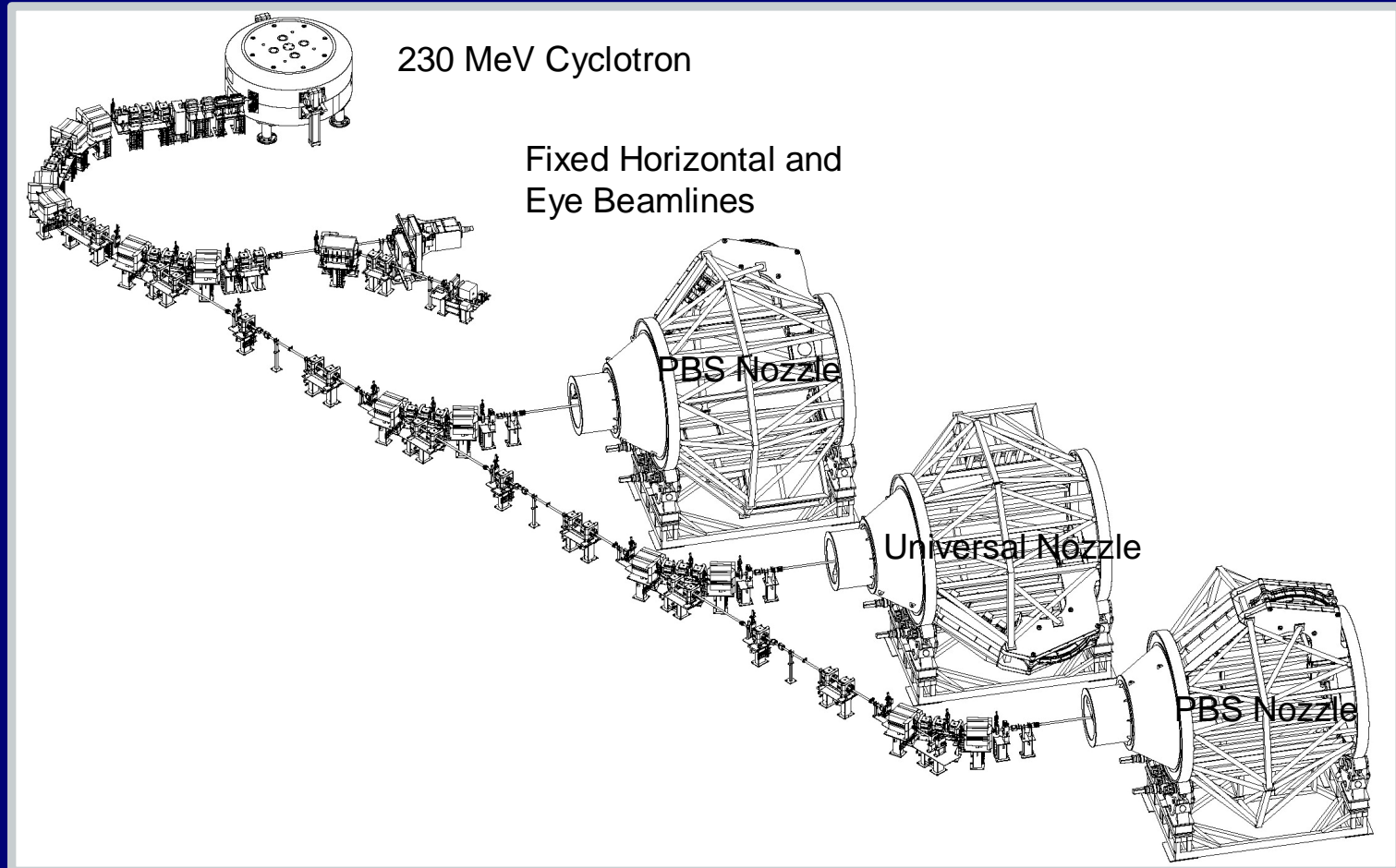
- 400.000 cancer patients in Germany per year
- About 200.000 radiotherapy cases per year
- Ruhr area with about 8 Mio inhabitants, about 38000 cancer patients
- Comprehensive Cancer Center at the Essen University Clinic, about 14.000 pts. per year
- Proven oncology & radiation oncology expertise
- Particle experience from neutron therapy and eye treatments (HMI Berlin, Nice)

# Essen Project



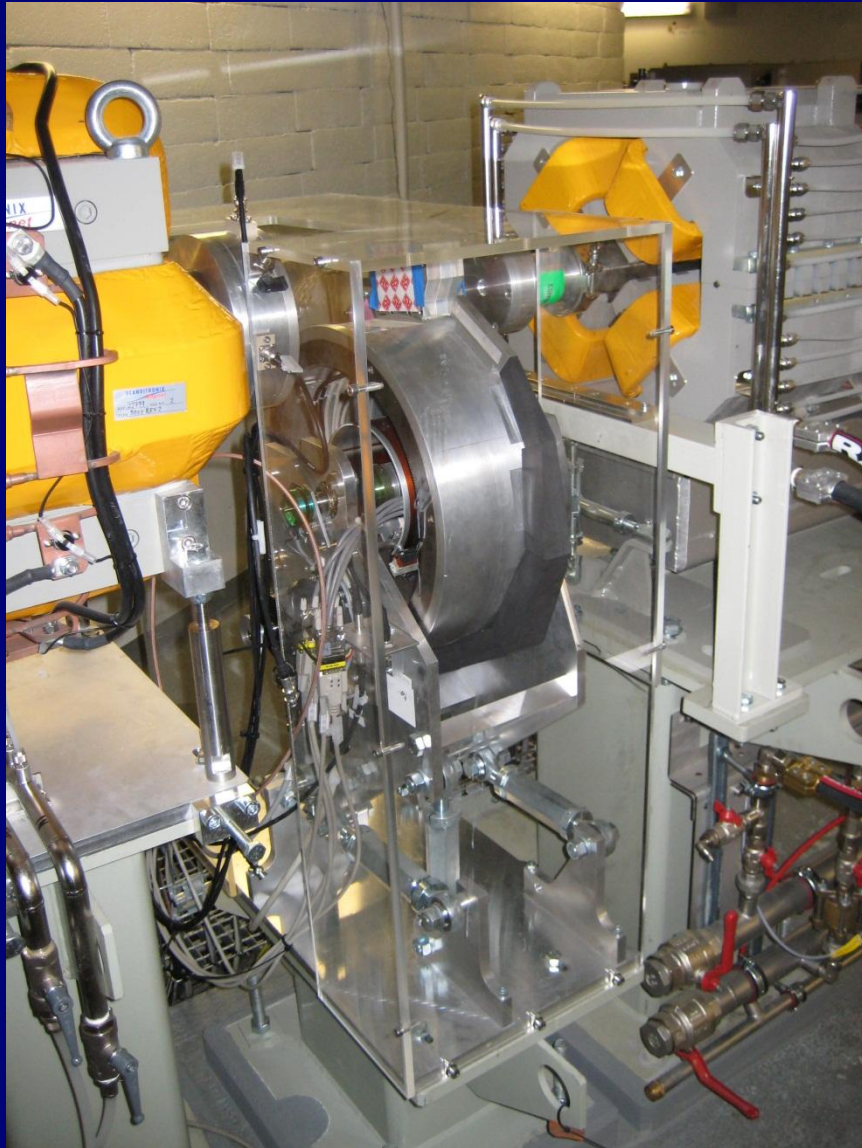


1. Proton beam scanning—uniform and non-uniform
2. Image guidance out of the treatment room (pre-positioning)
3. Optimized use of treatment rooms - pre-positioning and universal patient transport system
4. Patient positioning by MRI
5. State of the art treatment of moving targets
6. Infrastructure for daily patient imaging and adaptive treatment
7. TPS development – Robust 4D Trtm planning, dose tracking



- 220 Tons
- Internal source
- 230 MeV
- Excellent beam stability: size, shape, position
- Fast rf beam current control





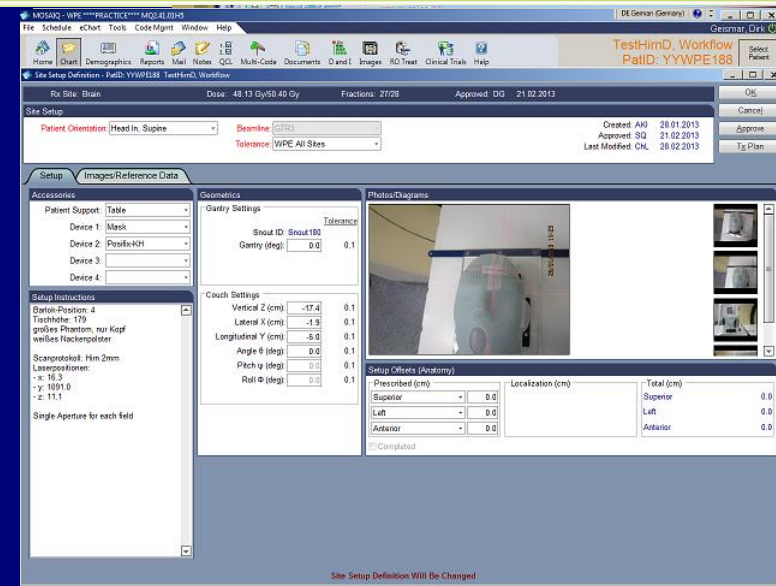
# Gantry

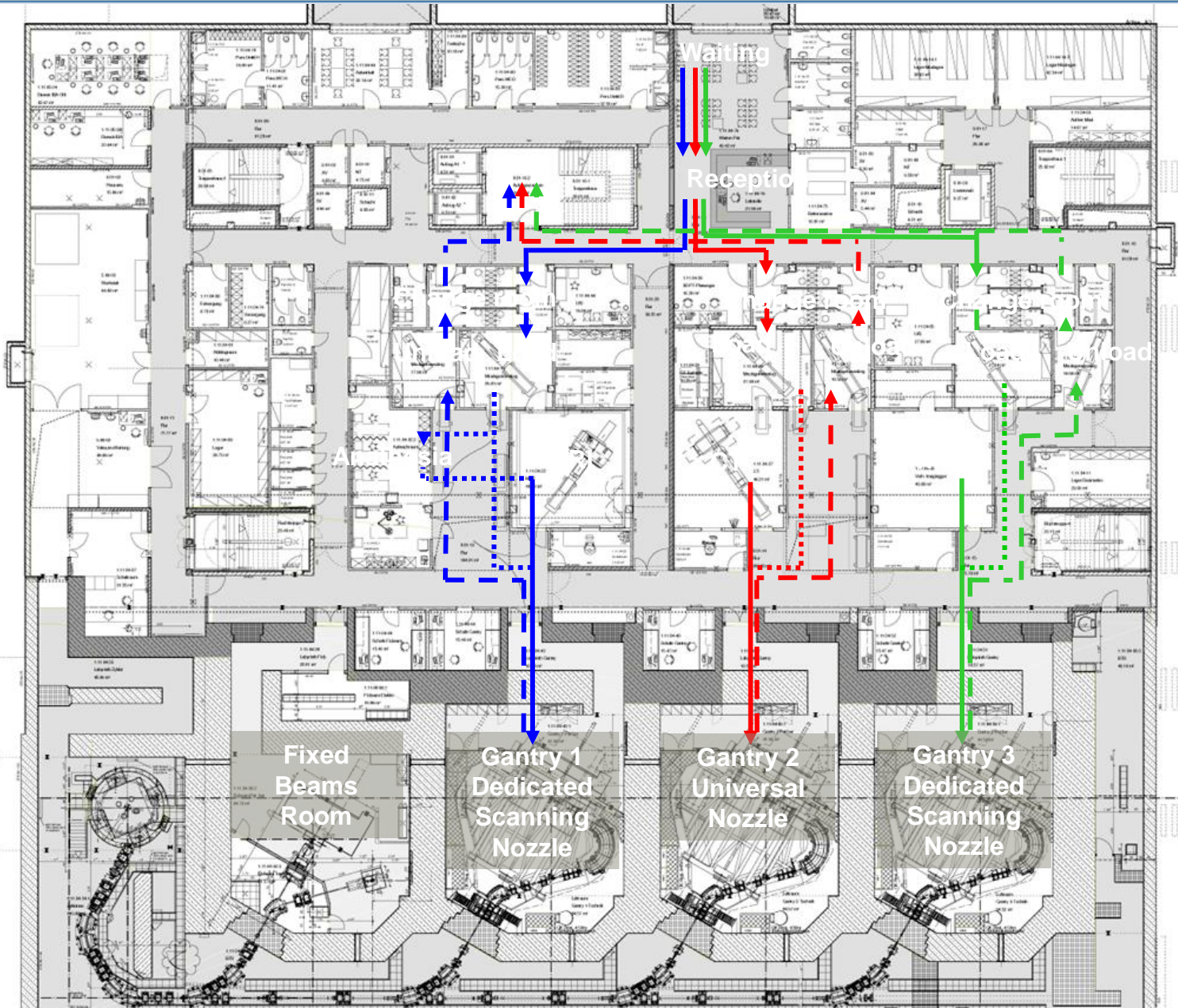


120 Tons  
360 degree

Accuracy:  $0,25^\circ$   
0,2 – 1 turn/minute

- 3 Proton gantry rooms (IBA)
- 1 Proton fixed beam room (IBA)
- X-Ray imaging suite (Medcom)
- Surface Tracking (Vision AlignRT)
- Gating DynR
- 2 CT's (Philips) for planning and verification
- 2 MRI's (Toshiba) for planning and verification
- OIS Mosaiq
- Treatment planning system (XIO, Elekta)
- Patient transport system (Oncolog)





# Patient Trolley

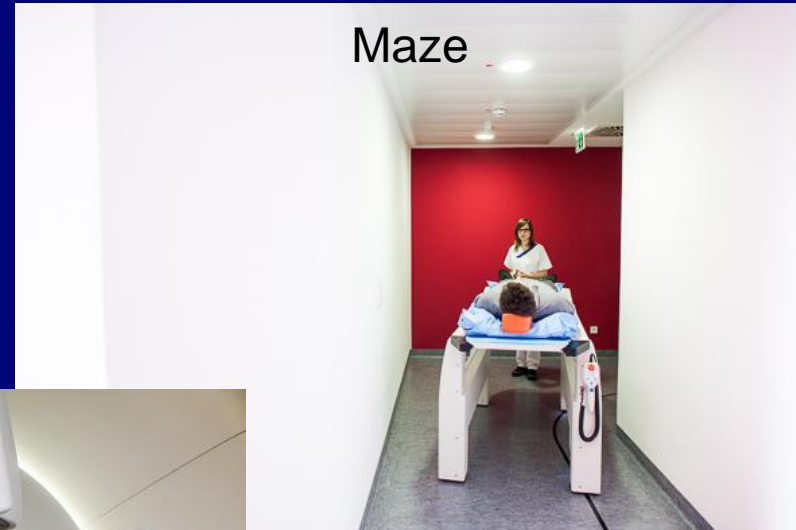
Verification-CT



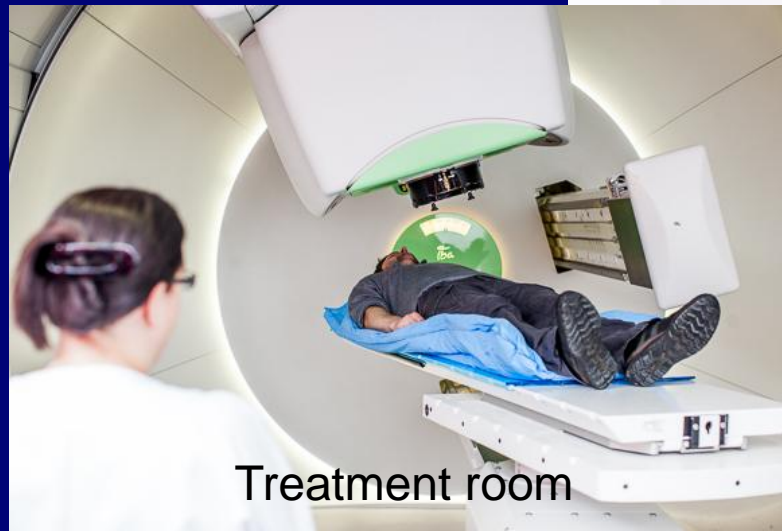
Loading room



Maze



Treatment room





- 20 Hours of Operations (Mo – Fr)
  - 15 hours for patient treatment
  - 5 hours machine- and patient QA
- 16 Hours of Operations (Sat)
  - 0 – 15 hours for patient treatments
  - 1 – 16 hours for machine- and patient QA
- 100-120 patients per day on Protons  
(1200 patients per year)
- One beam line will be optimized for pediatric patients

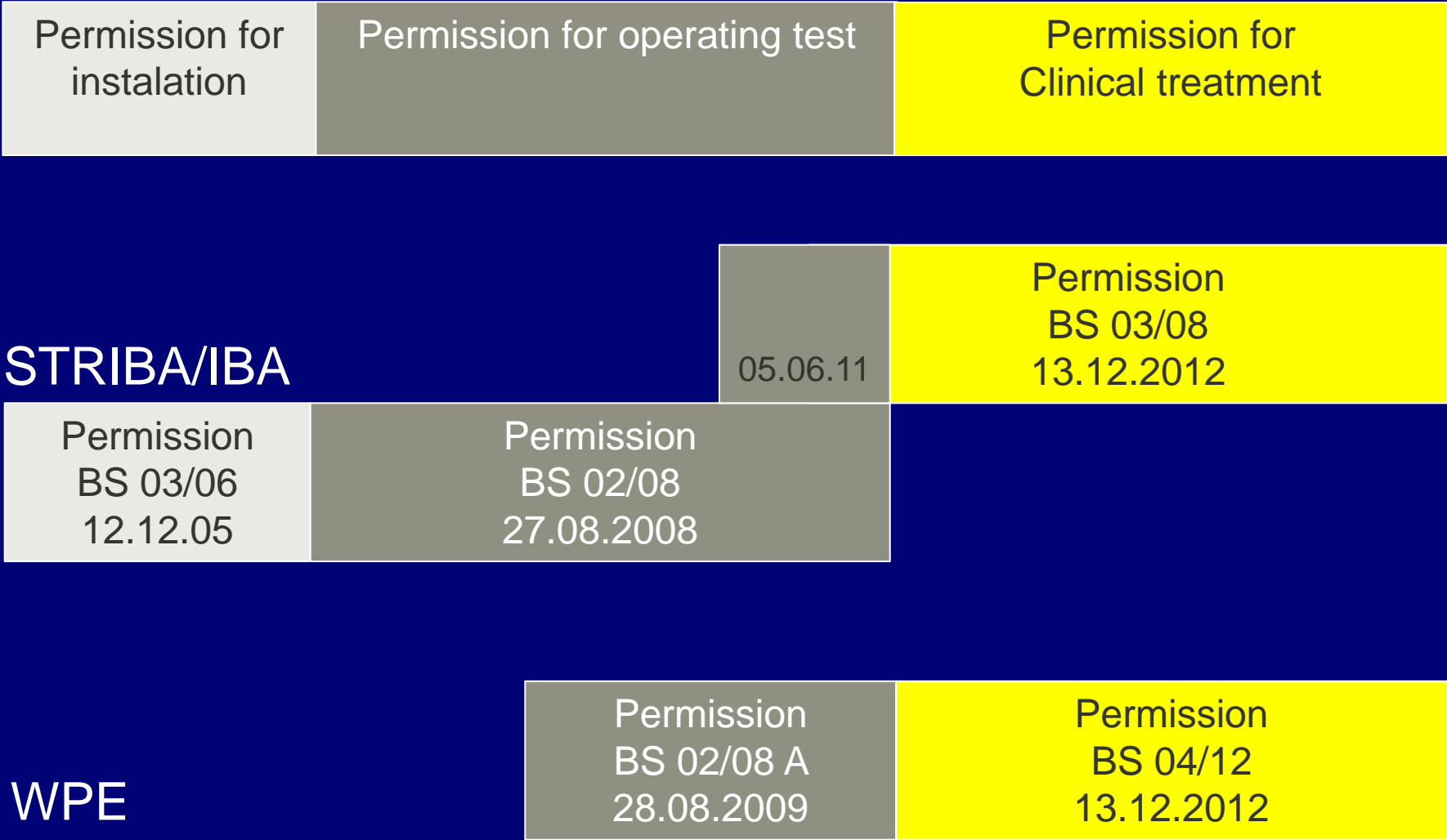
- Staff recruitment
- Staff education
- Determine equipment options
- System installation & training
- Medical protocol development
- SOP generation
- Communication with partners and authorities
- Radiation protection issues
- Workflow training and simulation
- Etc. ...

- Physicians
  - Radiation Oncologists
  - special approval by the authorities („Fachkunde“)
  - collect proton experience at other proton sites
- Physicists
  - Certified Medical Physicists
  - Special approval by authorities („Fachkunde“)
  - collect proton experience at other proton sites
- RTT's
- Studynurses, Casemanager, Nurses, Secretary

1. Patient Registration and Documentation (Mosaiq)
2. Immobilization and Planning-CT, if needed MRI
3. Planning procedure
4. Milling (US, DS)
5. QA-Procedures
6. Treatment (Mosaiq, Medcom, TCS)



- Close contact to the authorities
- Good cooperation with the supplier
  - Products has to fulfill legal requirements
- Discussion of special requirements
  - Radiation Safety
  - Quality Assurance
  - Workflow
  - Staff training
  - Backup solutions
- Ongoing Process



- Reimbursement by
  - Public health system
  - Privat health insurances
  - Foreign patients (EU and non-EU)
- Define indications
- Evidence for choosen indications
- Costs of treatment
- Reimbursement for concomittant procedures
  - Chemotherapie
  - Diagnostics
  - Anaesthesia
  - Surgery

- Private Health Insurance (10-20%)
  - no restrictions, individual cost acceptance recommended
- Public Health Insurance (80-90%)
  - 2 Indications covered today
    - Chordoma & chondrosarcoma of base of skull
    - Uveal melanoma
  - 15 Indications covered in a study setting
  - Children, if treated in protocols of GPOH
  - Individual clearance



It can be a long way to start a proton facility

Development of cooperations and networks

Communication with public and private health care leader

Establish dialogue with authorities

You have to recruit and train your staff worldwide. You have to convince your staff to stay.



Thank you!

