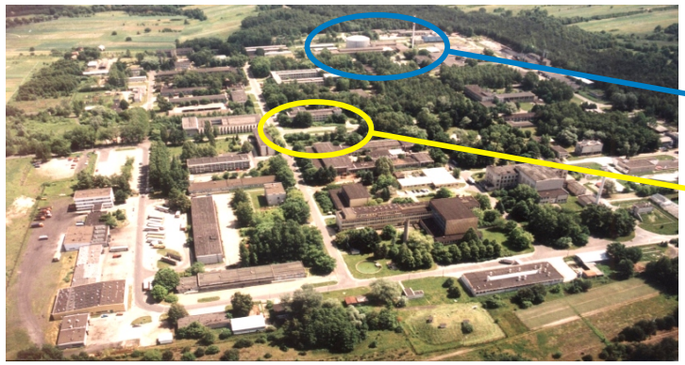
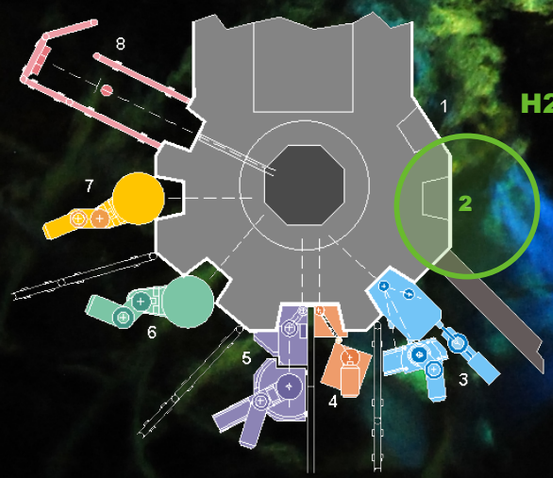
Epithermal neutron source at MARIA Research Reactor



MARIA Reactor

Laboratory of Mixed Radiation Dosimetry



H2 - Neutron epithermal beam

H3, H4, H5, H6, H7, H8 – another neutron beams for spectrometry, dyfractometry and radiography

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RENAISSANCE OF BNCT BORON NEUTRON CAPTURE THERAPY

NEUTRONY•H2

National Centre for Nuclear Research

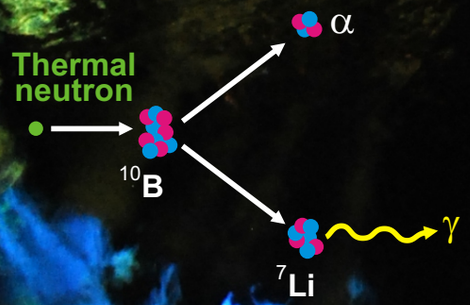
BNCT as next-generation method for highly selective cancer treating

What is BNCT?

It is a treatment method for some types of tumour, especially brain tumours. First, the patient is injected with a tumour localizing drug containing a non-radioactive isotope that has a high propensity to capture slow neutrons. In the second step, the patient is radiated with epithermal neutrons, which after losing energy as they penetrate tissue, are absorbed by the capture agent which subsequently emits high-energy charged particles, therapy resulting in a biologically destructive nuclear reaction.

Clinical studies:

- brain tumours
- malignant melanomas
- head and neck cancers
- liver, breast, lung cancer etc.



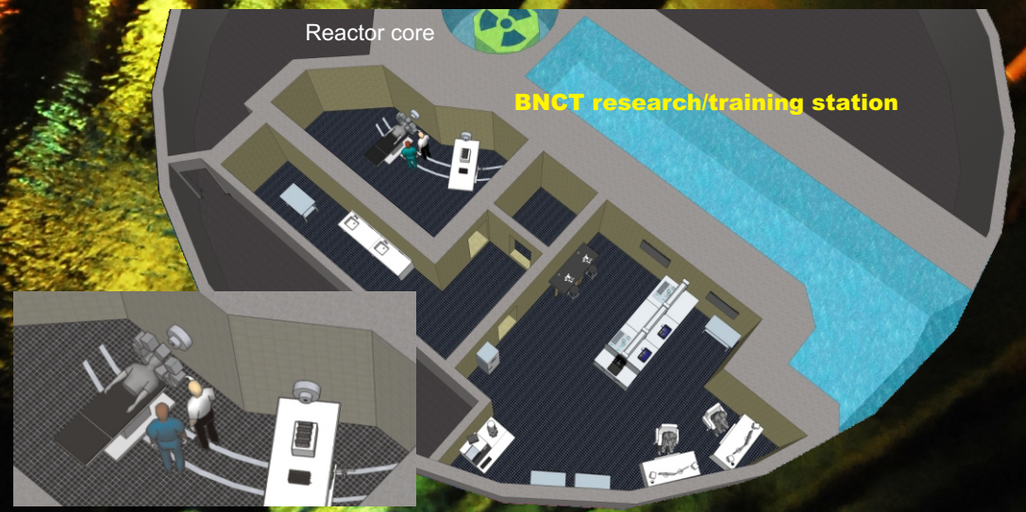
Neutron sources for BNCT:

- Past: reactor-based BNCT
- Future: accelerator-based BNCT in hospitals

The advantages:

- recurrent cancer treatment
- only one session of radiation treatment
- cell level treatment
- uncompetitive with classical radiotherapy

BNCT research/training station at MARIA Research reactor



- radiobiology
- boron carriers
- dosimetry
- Pg-SPECT
- microdistributions
- biological material
- irradiation
- oncologists, radiologists, medical physicists and medical staff training
- treatment planning systems
- preclinical studies
- phantom for BNCT developement and tests
- technical equipment for BNCT