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The main technical principles of neutron-capture therapy

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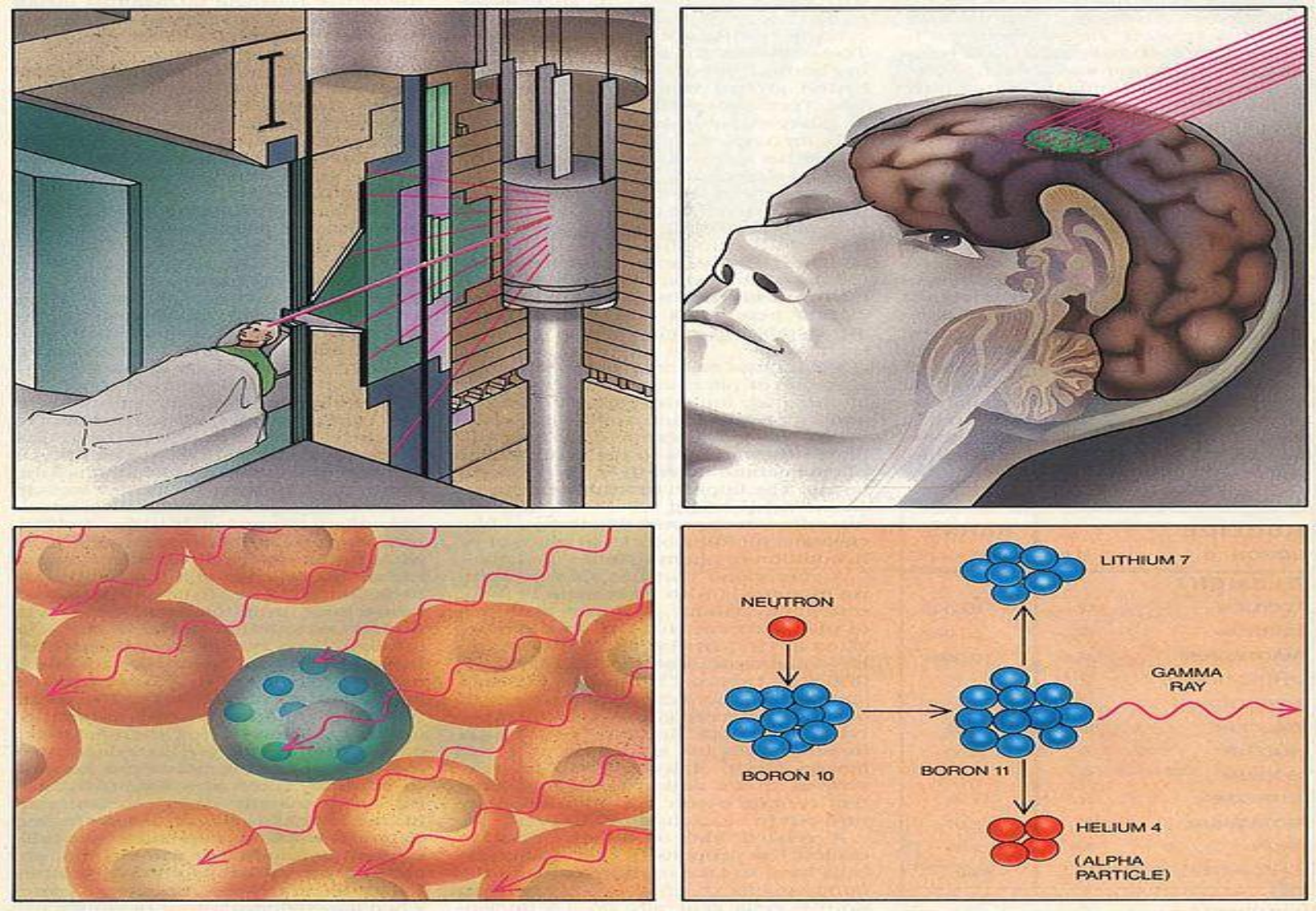
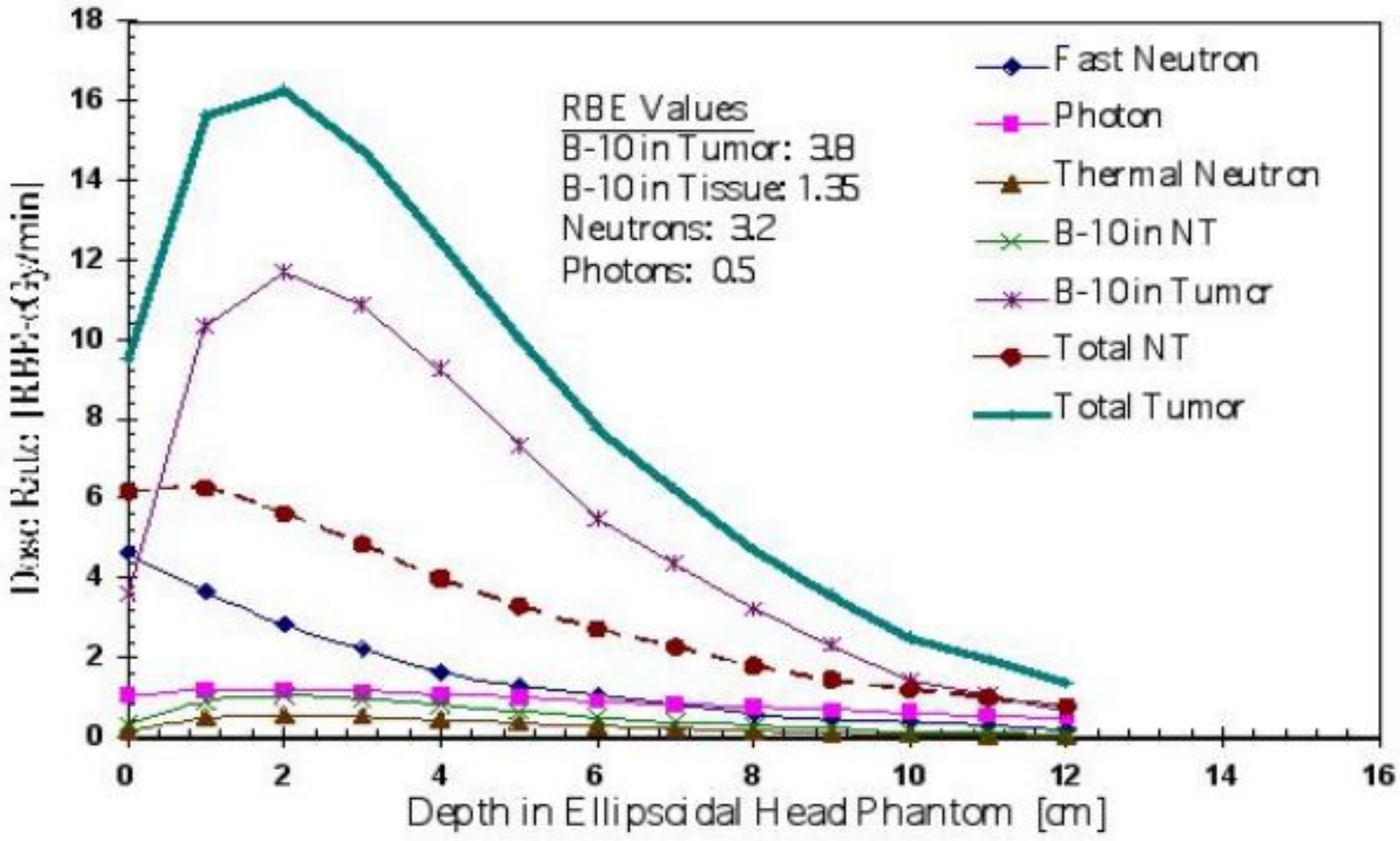
Boron neutron capture therapy (BNCT)



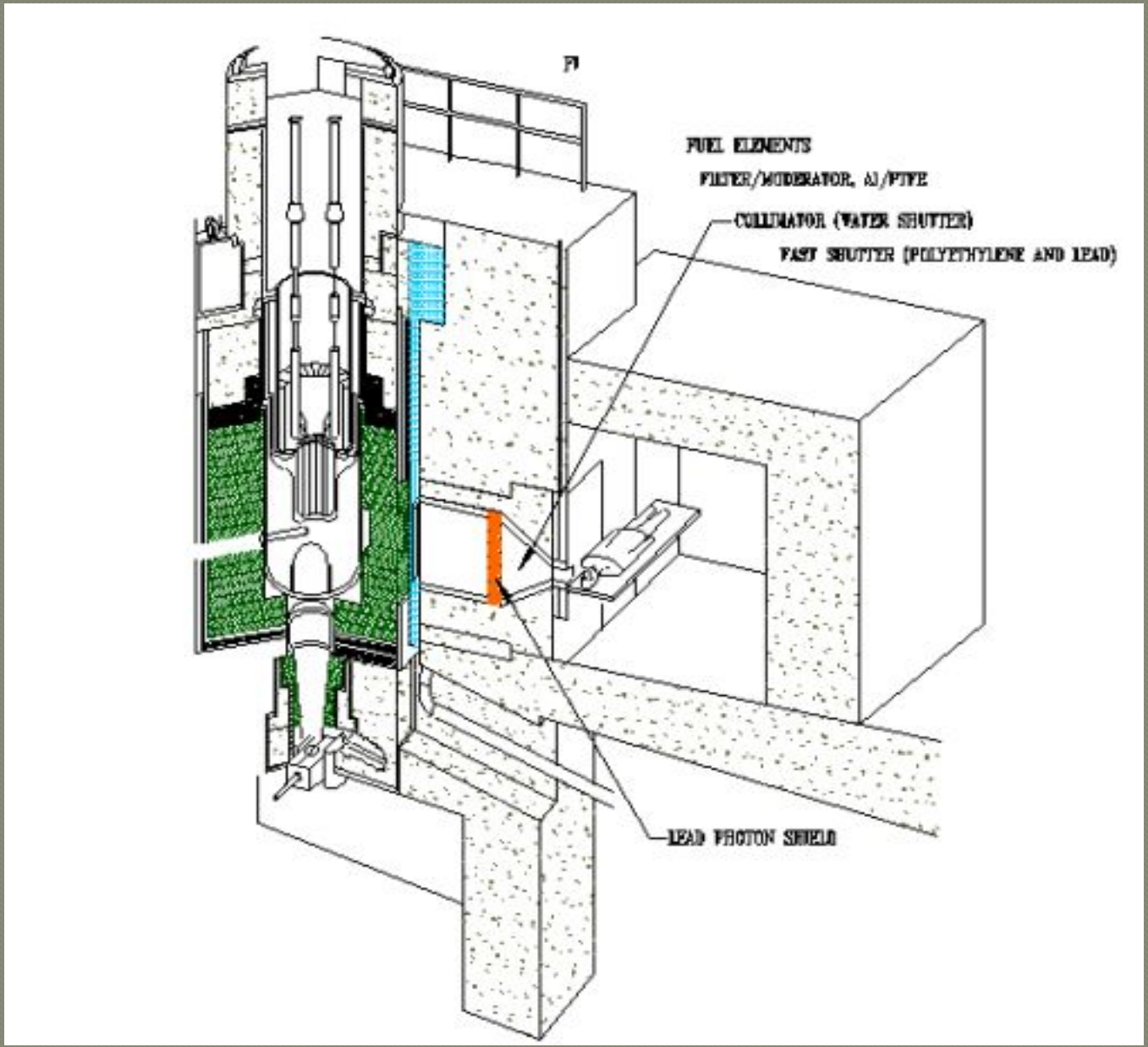
Weighted depth dose curves showing the various components



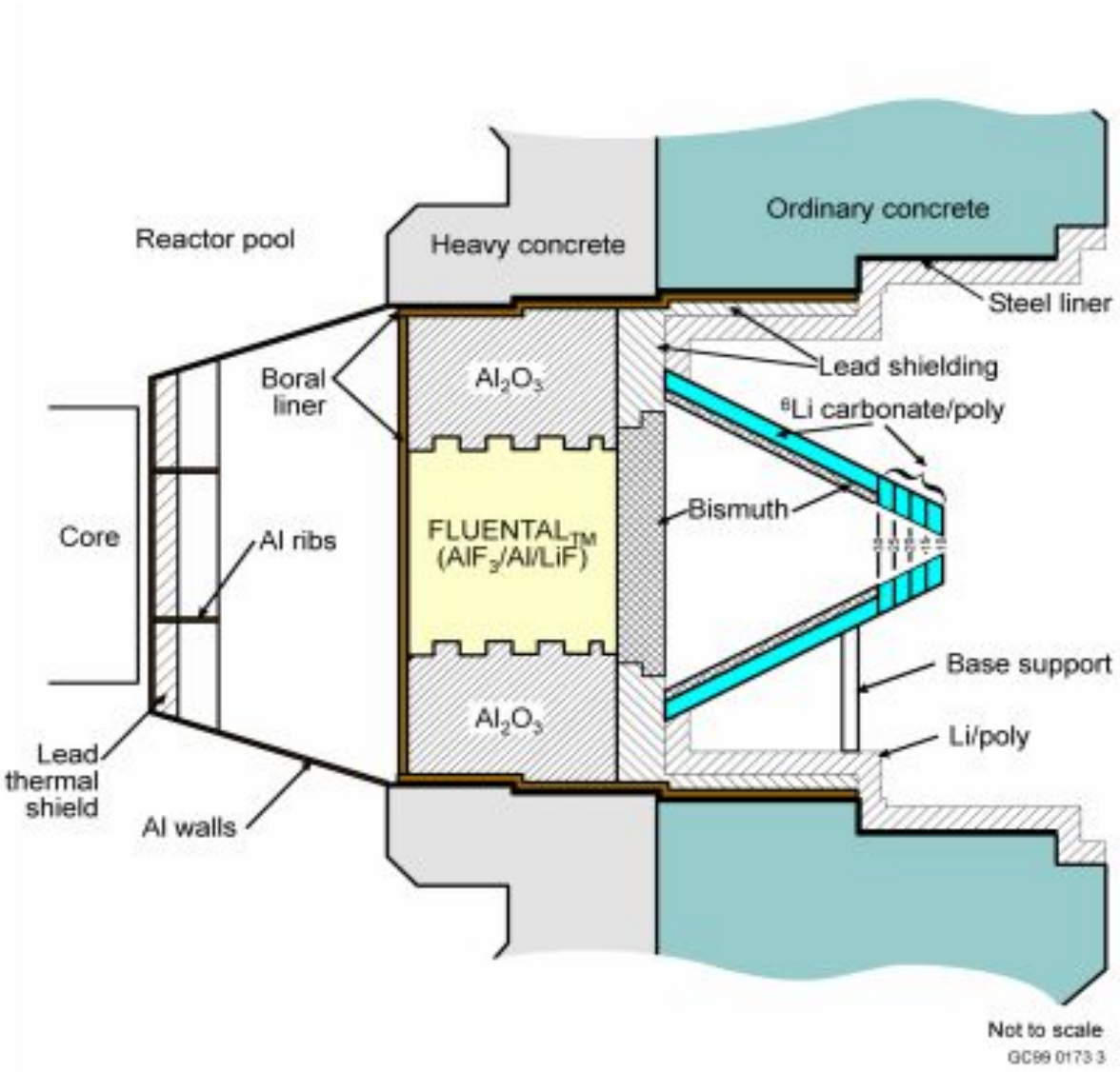
Neutron sources for capture therapy

- *Converted thermal reactors using spectrum shifting and filtering*
- *Fast reactors*
- *Fission converters*
- *Accelerators*
- *Californium source*

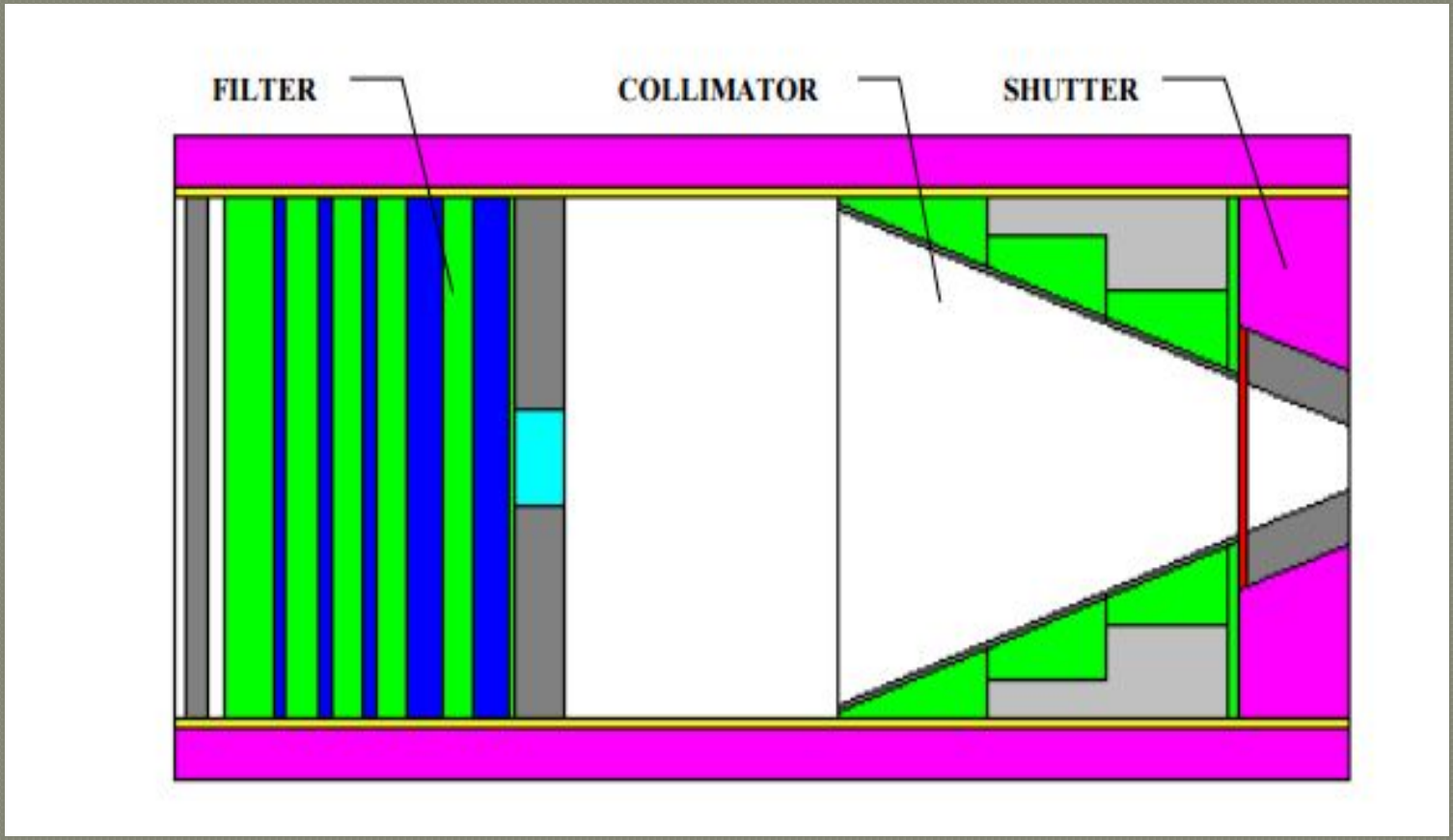
Example of a fission converter system



Example of an effort to minimize core to patient distance.



Typical spectrum shift arrangement



The main criteria for safe operation

- *Reliability*
- *Availability*
- *Continuous versus intermittent operations*

Personnel at the NCT facility

- Reactor operations staff
- NCT operations staff
- Medical staff

Resume

Neutron-capture therapy is a promising method in the treatment of severe forms of cancer. To implement it, it is required to create a specialized medical reactor facility, the purpose of which is to form a neutron beam to irradiate the patient. To this end, multipurpose research reactors can also be used, but a specialized installation has several advantages over them: achieving the required technical parameters, location directly in the clinic, limiting reactor failures and hence greater reliability. The disadvantages include the high cost of such installations.

Thank you for attention