Diagnostics of the proton beam position using the luminescence of the lithium neutron producing target

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Accelerator source of epithermal neutrons



1 - vacuum-insulated tandem accelerator;

2 - cooled diaphragm with an aperture of26 mm;

3 - nondestructive DC current transformer Bergoz;

4 - diagnostic tank with a retractable Faraday cup;

5 - corrector;

6 - bending magnet;

7 - branch pipe of bending magnet with a window for observing the lithium target;
8 - diagnostic tank with Faraday cup and vacuum pumping;

9 - diagnostic tank with vacuum pumping;

10 - gate valve;

11, 16 - lithium targets;

12 - beam shaping

assembly (BSA);

13 - magnetic scanner;

14 - gas stripping target;

15 - gate valve;

17 - branch pipes with windows for observation.

The luminescence spectrum of the lithium target



Measuring of the lithium thickness





Accelerator source of epithermal neutrons for BNCT



Separation of the beam components



AFAD-2021

Summary

- Irradiation of the lithium target by 2 MeV protons leads to the luminescence of lithium in the visible range of the spectrum;
- Luminescence of lithium is used as an optical diagnostics of the proton beam;
- Optical diagnostics may be applied during neutrons generation;
- Optical diagnostics provides real-time monitoring of the proton beam size and position on the lithium target;
- Luminescence increased the reliability of the argon current measuring and was applied while lithium thickness measuring.

