A plasma neutron source based on the gas dynamic trap for incineration of radioactive wastes

From 2011-04-16 to 2012-01-15, closed project

**Objective**

"Recently, the idea of coupling a sub-critical fission reactor and a DT-fusion plasma device generating 14 MeV neutrons for the incineration and transmutation of long-lived isotopes of nuclear waste has attracted increasing interest. For a number of years the Budker Institute of Nuclear Physics (BINP), Novosibirsk, Russia in collaboration with the domestic and foreign organizations develops the project of 14 MeV neutron source. This neutron source is based on the plasma Gas Dynamic Trap (GDT), which is a special magnetic mirror system for plasma confinement. This new type of neutron source could have sufficiently high neutron production intensity for driving such a transmuter, which is a sub-critical fission reactor loaded with nuclear waste that has to be transmuted into stable or short-lived radioactive isotopes. In particular, after optimization of the plasma parameters it could be comparable and even exceed the efficiency of the accelerator based spallation neutron source, which is presently the favoured variant. The major objectives of the proposed work in the frame of Marie Curie Action are the optimization of the GDT based neutron source as a driver of sub-critical fission reactors for the transmutation of long-lived radioactive waste. To achieve this goal, it is necessary to make use of knowledge and calculation tools in both areas in the field of plasma physics for fusion from the side of the applicant Dr. A. Anikeev (BINP) and in nuclear fission reactor physics and technology from the side of the Research Centre Karlsruhe, which is one of the biggest science and engineering research institutions in Germany. The main phase of the project is 18 months. During the 9 months of return phase we plan to continue the project in Novosibirsk and upgrade the existing Gas Dynamic Trap device to a so called “hydrogen prototype” of the projected neutron source and to carry out high-parameter experiments proofing its physical feasibility."

**Related information**

- **Report Summaries**
  - Final Report Summary - GDT-BURNER (A plasma neutron source based on the gas dynamic trap for incineration of radioactive wastes)
Coordinator
Budker Institute of Nuclear Physics of SB RUS
Academician Lavrentiev Avenue 11
630090 Novosibirsk
Russia

EU contribution: EUR 11 250

See on map

Activity type: Research Organisations

Administrative contact: Petr Bagryansky
Tel.: +7-383-329-4224
Fax: +7-383-330-71-63
Contact the organisation

Subjects
Employment issues - Scientific Research

Last updated on 2015-03-12
Retrieved on 2019-07-15

© European Union, 2019