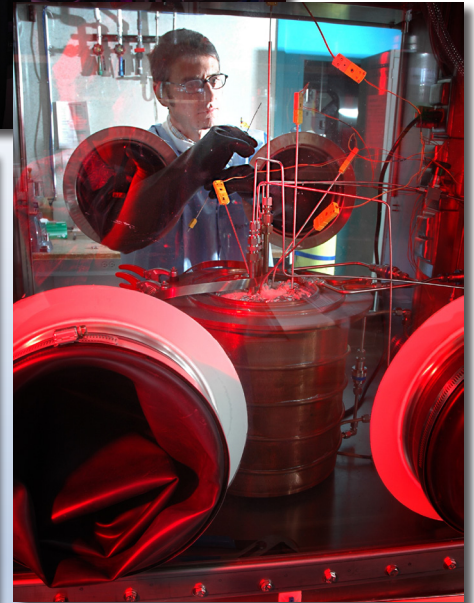
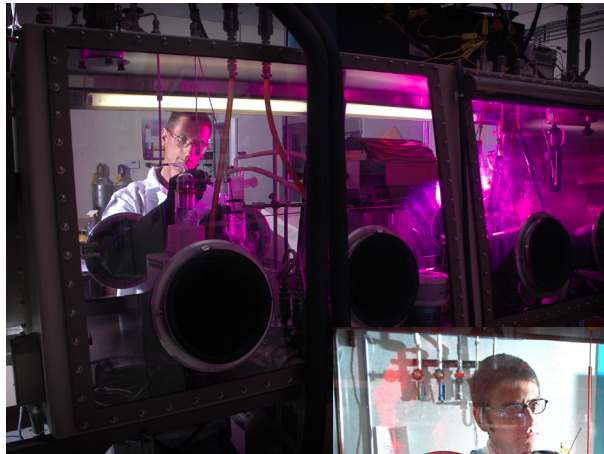
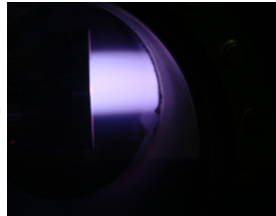
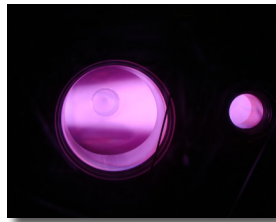


The Safety and Tritium Applied Research facility is dedicated to the development of safe nuclear technology for fusion and advanced fission energy systems



The Energy of Innovation



Safety and Tritium Applied Research Facility

The Safety and Tritium Applied Research Facility is a National User Facility of the Department of Energy Office of Science managed and staffed by the Idaho National Laboratory Fusion Safety Program and located within the boundaries of the Advanced Test Reactor (ATR) Complex. STAR's 400 m² (1,300 sq ft) of space is available to scientists throughout the world to direct and participate in research activities related to the development of safe nuclear

technology, with a focus on issues related to the radioactive isotope of hydrogen, tritium (3H). As a National User Facility, it is accessible to university faculty and graduate students, public- and private-sector scientists and researchers from other DOE laboratories and international collaborations.

The mission of STAR is aligned to that of its main funding source, the DOE Fusion Energy Science program (FES). The pursuit of fusion

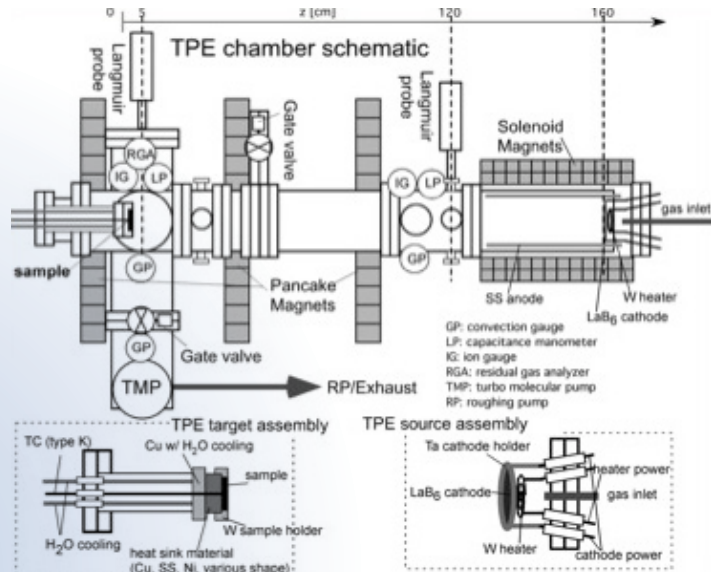
energy embraces the challenge of bringing the energy-producing power of a star to earth for the benefit of humankind. The promise is enormous—an energy system whose fuel is obtained from seawater and from plentiful supplies of lithium in the earth. The system's resulting radioactivity is modest, and yields zero carbon emissions to the atmosphere. The pursuit is one of the most challenging programs of scientific research and development

Continued next page

Continued from previous page

that has ever been undertaken. With the support of FES, a devoted, expert and innovative scientific and engineering work force has been responsible for the impressive progress in harnessing fusion energy since the earliest fusion experiments over 60 years ago. As a result, we are on the verge of a new age in fusion science during which researchers will undertake fundamental tests of fusion energy's viability, and the INL Fusion Safety Program is part of it.

Experimental activities at STAR in the area of fusion science and technology development are coordinated through the Virtual Laboratory for Technology (VLT) and primarily involve the investigation of Plasma Materials Interactions (PMI) and the related development of Plasma Facing Components (PFC), to which are dedicated the largest experiment in the facility, the Tritium Plasma Experiment (TPE), and the Tritium Ion Implantation experiment (TRIIX). The second area of work involves the tritium breeder and coolant materials, in particular high temperature fluids such



The largest experiment at STAR: the Tritium Plasma Experiment.

as liquid metals (lithium and its alloys) and molten salts (fluoride based). Validation experiments are also carried out in support of safety analysis and related code development, in particular for materials chemical reactivity during accident scenarios.

The mission of STAR is not limited to fusion. As a National User Facility it is open to experiments in support of all INL and DOE programs for

which issues related to tritium and high temperature fluids are an important component. These include the measurement of tritium permeation through heat exchanger candidate materials of the Next Generation Nuclear Plant (NGNP), material issues and tritium transport in salt-cooled advanced reactor concepts (Fluoride High Temperature Reactors, FHR) and support activities for ATR irradiation experiments.

For more information
Joseph Campbell
208-526-7785
joseph.campbell@inl.gov

**A U.S. Department of Energy
National Laboratory**



For more information:
<https://fusionsafety.inl.gov/SitePages/Home.aspx>
<http://science.energy.gov/fes/>
<http://www.ornl.gov/sci/vlt/>
<http://www.iter.org/>
<http://www.nextgenerationnuclearplant.com/>
<https://www.ornl.gov/fhr/>