Senate Standing Committee on Economics
ANSWERS TO QUESTIONS ON NOTICE
Innovation, Industry, Science and Research Portfolio
Additional Estimates Hearing 2010-11
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AGENCY/DEPARTMENT: AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION

TOPIC: Neutron beam instruments

REFERENCE: Written Question – Senator Colbeck

QUESTION No.: AI-55

How many of the 13 neutron beam instruments are now operational – and at what stage are the remaining non-operational instruments?

ANSWER

ANSTO offers highly sought after neutron beam instruments that draw some of the best researchers worldwide and locally to this landmark national infrastructure facility. Of the 13 neutron beam instruments at ANSTO, the following seven instruments are operational:

1. ECHIDNA, a High-Resolution Powder Diffractometer used to analyse the structure and properties of materials including cements, minerals, hydrogen-storage media and optical materials;
2. WOMBAT, a High-Intensity Powder Diffractometer used for applications such as clean energy storage and drug-delivery systems;
3. KOALA, a Laue Diffractometer used for materials science problems, including lightweight hydrogen-storage materials, and also the study of new pharmaceuticals;
4. KOWARI, a Strain Scanner used to reveal stresses in welds such as rails, pipelines and airplanes and stresses in wear resistant and corrosion resistant coatings;
5. PLATYPUS, a Neutron Reflectometer used to study surfaces, thin films and soft matter which will enable the development of data storage materials to be used in future generations of computers, high efficiency light emitting materials for TV screens and new biotechnologies for tissue growth;
6. QUOKKA, a Small-Angle Neutron Scattering used to investigate nanoscale structures in materials including food components such as proteins and to understand how the human body breaks down starches and fats; and
7. TAIPAN, a Thermal 3-Axis Spectrometer used to study materials such as magnets and superconductors which has applications for high information density magnetic storage computer hard disks, thumb drives and memory storage devices.

Six instruments are currently under construction or in the design/procurement phase:

8. PELICAN, a Time-of-Flight Spectrometer, is currently under construction and is due for completion in late 2011. PELICAN will be used to study materials such as proteins, polymers, glass and liquid samples and to analyse the dynamics of protein structures;

9. SIKA, a Cold Neutron 3-Axis Spectrometer funded by the National Science Council of Taiwan and managed by the National Central University in Taiwan, is currently under construction and is due for completion in late 2011. SIKA will be used to investigate how materials such as superconductors respond to changes in temperature or to an applied magnetic field;
10. KOOKABURRA, an Ultra Small-Angle Neutron Scattering Instrument, is currently in the design/procurement phase and is due for completion in 2013. KOOKABURRA will be used to study ultra small objects such as bacteria, blood, viruses, minerals, food and biological molecules;

The following three instruments are part of Phase 2 of the Neutron Beam Instruments Program, which is funded through the Australian Government's Super-Science Initiative:

11. DINGO, an instrument for Neutron Radiography/Imaging/Tomography, is currently in the design/procurement phase and is due for completion in 2013. DINGO will be able to see inside objects, for example, examining valuable ancient artefacts or rare fossils; conducting quality control on pyrotechnic devices like detonators; detecting water damage in aircraft components. DINGO would be fully capable of making movies of objects including the flow of fluids through running engines, motors and fuel cells;
12. BILBY, a 2nd Small-Angle Neutron Scattering Instrument, is currently in the design/procurement phase and is due for completion in 2013. BILBY will cover the full range of research undertaken at QUOKKA but will also extend to larger and smaller objects than those that can be analysed using QUOKKA; and
13. EMU, a High-Resolution Backscattering Spectrometer, is currently in the design/procurement phase and is due for completion in 2013. EMU will be used to measure chemical interactions and motions in polymers, proteins, and other biological molecules as well as the ability to measure the dynamic properties of viscous liquids relevant to the petrochemical and food technology industries.

Further information regarding the instruments is available at ANSTO's website. The link is as follows: http://www.ansto.gov.au/research/bragg_institute/facilities/instruments