Fusion energy boost for high-tech Australia

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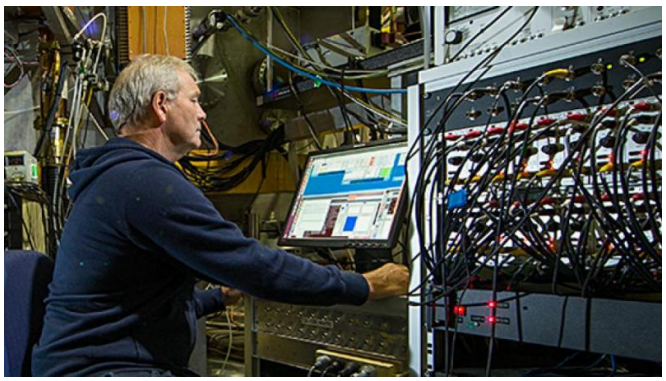

Professor John Howard at the ANU H1 Heliac fusion experiment. Credit: Stuart Hay, ANU

The world's largest fusion energy experiment, ITER, has turned to Australian physicists to supply a crucial imaging system for the multi-billion-euro experiment.

Engaging with ITER is a great opportunity for Australian high technology industry and researchers, said Director of the ANU Australian Fusion Facility, Professor John Howard.

"There is huge potential if Australian businesses get listed as high-tech providers for ITER," he said.

Nuclear fusion is the process that powers stars. It promises carbon-free clean power, by fusing hydrogen nuclei to form helium in high-temperature plasmas like the sun, and has none of the waste by-products associated with current uranium-based nuclear power.

The ITER project is under construction in the south of France and is expected to produce 500 megawatts of power in experiments by the end of the next decade.

Scientists at ANU Research School of Physics and Engineering have been contracted to undertake a design study for the installation of an advanced system that images plasma temperature and flow in ITER.

"It's effectively a Doppler speed gun for a fusion plasma," said Professor Howard. "These coherence imaging systems were pioneered at the ANU and are installed on fusion devices around the world."

Head of Diagnostics at ITER Central Team, Michael Walsh, said the ITER project hoped build stronger links to the ANU and its technology.

"This has been a missing piece of the jigsaw puzzle for some time," he said.

The system developed by ANU focusses on the floor of the fusion reactor known as the divertor.

"The centre of the plasma is over 200 million degrees. Where the edges touch the divertor it's like a welding arc," Professor Howard said.

"During unexpected turbulence the fusion plasma can inflict power fluxes onto the walls comparable to those at the sun's surface.

"Figuring out how to manage the divertor heat flows is a major problem to solve. No other system can meet ITER's requirements for measuring and understanding the flows in this region of the experiment," he said.

Professor Howard has been invited to meet ITER personnel at the construction site in the south of France in June to discuss installing the ANU system.

The ITER construction contracts are shared between the seven partner organisations: the European Union, the United States, India, Japan, China, Korea and Russia.

Because Australia is not a member of ITER, the ANU group is fostering links with the USA ITER partners, who have already installed a number of coherence imaging systems on their fusion

experiment DIII-D, in San Diego. ITER USA will be responsible for the relevant observation ports on the ITER device.

Provided by Australian National University