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Making and being ready to take key measurements in Fusion Power Plants

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Currently, there are several magnetic fusion devices in design or construction that expect to cross the $Q>1$ region. These devices are critical to the next steps of Fusion, the long-term energy mix and the resolution of the whole climate change situation.

These machines will need an extensive set of measurements to allow the running of these devices, to preserve the integrity of the infrastructure and to ensure safe and long running life.

Although there could be a thinking that advanced fusion machines will have very few diagnostics, in reality, the number will have to be based on the needs of the facility. This will set the fundamental minimum limit on what is needed. To manage this, the Diagnostics community needs to ensure that the appropriate measurement systems are developed and ready to be deployed in the fusion power devices. This will mean rethinking how some measurements are deployed and made.

ITER has made this step in several systems and some of these will be discussed. Power plants have even more advanced needs and so this work will need to be continued to ensure that the developments of the future machines are not delayed.

Primary author: WALSH, Michael (ITER ORGANIZATION)

Presenter: WALSH, Michael (ITER ORGANIZATION)

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