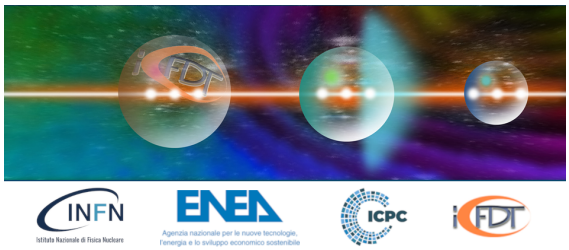

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Exploitation of neutron spectroscopy measurements for assessment of DT fusion power without in-vessel calibration

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Neutron measurements are of crucial importance for nowadays nuclear fusion plasma experiments, even more for the forthcoming DT fusion reactors. In particular, neutron diagnostics are a key tool for measuring the fusion power which is a primary parameter to evaluate the fusion performance. Historically, fusion power measurements are based on counting the neutrons with fission chambers or activation foils and translate the counts in total neutron produced by the extended source which is the plasma. This is supported by intense neutron transport simulations benchmarked by extensive in-vessel calibration campaigns.
In this work an alternative method for assessing the fusion power without the need of an in-vessel calibration will be presented. It is based on the neutron spectroscopy measurements with single crystal diamond detectors along collimated lines of sight. Beyond their use as 14 MeV neutron spectrometer, in the last two JET deuterium-tritium (DT) experimental campaigns, diamonds have been exploited as DT neutron yield monitor. Results from the JET DT campaigns will be described, together with a comparison with the Magnetic Proton Recoil (MPR) data.

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