**Latest developments of SDD detectors for the neutron/gamma sensor for DEMO**

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In this poster, we present the latest development of neutron/gamma multi-LOS sensor for DEMO. Aim of this sensor is the measurement of fusion power and other relevant plasma parameters (like for instance position or fuel ratio nD/nT) for the control of the future DEMO fusion plant through the monitoring of 14 MeV neutrons and 16.7 photons form the deuterium-tritium reaction in burning plasma. Present plans envisage the use of Single-crystal Diamond Detectors (SDD) as neutron detectors, due to their compactness and well-known characteristics. However, they still need a wide R&D approach to make them completely competitive to other state-of-the-art neutron detection techniques. Moreover, they are affected by gradual degradation due to radiation damage and high temperature. In particular, in this poster we discuss a method to monitor the characteristics of the SDD during its use as a neutron spectrometer. It is known that the good characteristics of SDD as a 14 MeV neutron detector are due to its spectroscopic capabilities, and in particular the presence, in the response function, of a well-defined peak due to the 12C(n,)9Be reaction. However, the radiation damage can cause broadening of such a peak (with loss of energy resolution), reduction of the counting rate and, in definitive, to a failure of the whole detector. During long plasma discharges like the ones envisaged in DEMO, it is impossible to make specific tests on the functionality of neutron detectors; it is thus of paramount importance to develop a monitoring method able to recognize the degradation of the SDD from the same data collected by the detector during its standard use (i.e. neutron spectra from burning plasma). At present, the method is performed off line, but possible developments are discussed that may lead to the implementation of it into an FPGA for real time monitoring of the different SDD in the sensor.