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P1.1076 Frist time neutral beam heating on Wendelstein 7-X

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See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.1076.pdf

In the recent experimental campaign of W7-X, a neutral beam injection (NBI) system was put into operation for the first time. This system is in many parts identical to the system on AUG. It consists of two injectors, NI21 and NI20, that can accommodate up to four radio-frequency driven ion sources. The acceleration grid spacing of each source is optimized for 55 kV hydrogen or 60 kV deuterium injection with a neutral beam power at the plasma of 1.7 and 2.5 MW, respectively. The pulse length is limited to 6.5 sec in hydrogen, at a repetition rate of one pulse every three to five minutes. Both injectors are located symmetrically w.r.t. the magnetic field configuration of W7-X. NI21, so far, has been operated with two sources in hydrogen. The technical commissioning involved operating the beams onto an internal calorimeter. This confirmed the expected neutralization efficiency, beam divergence and species fraction. Validation of the safety interlocks involved NBI pulses into the empty plasma vessel. The impact of NBI generated fast ions on plasma vessel components during injection into plasmas was carefully assessed. For certain magnetic field configurations it was possible to heat and sustain the plasma with NBI as the only heating source for close to the technical limit of 4.8 sec. The beam attenuation in the plasma approximately agrees with predictions. About 300 plasma discharges involved NI injection and, overall, the system performed reliably in single pulses or pulse trains up to about 100 Hz.

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