

Extension of the operating space of high- β_N fully non-inductive scenarios on TCV using Neutral Beam Injection



The fully non-inductive sustainment of high normalized beta plasmas (β_N) is a crucial challenge for the steady-state operation of a tokamak reactor.

Steady-state regimes have been explored on TCV using the newly available 1MW Neutral Beam Injection (NBI) system.

The operating space is extended towards plasmas that are closer to those expected in JT-60SA and ITER.

A strong contribution to β_N of bulk and fast ions (FIs) from NBI is experimentally evidenced and confirmed by modelling.

FI charge-exchange reactions are the main loss channel for NBH/CD efficiency in the explored scenarios.

Obtaining fully non-inductive ITBs with NBI has not proven possible thus far on TCV.

