Steady state tokamak research

Talk-I: SSTR, AT operation, and MHD issues
Talk-II: Parallel and Perpendicular transport in advanced tokamak)

M. Kikuchi, JAEA

Continuous operation of tokamak requires maximum utilization of the bootstrap current [1]. Since then, we have made significant efforts to develop the reactor concepts [2] and its physics basis [3]. We summarized progress in this field in the Reviews of Modern Physics [4].

In the 1st talk, I will give an introduction on the concept of SSTR (steady state tokamak reactor), its operation scenarios (weak shear, negative shear and current hole operations) and their MHD physics (ideal, resistive, AEs).

In the 2nd talk, I will describe parallel and perpendicular transport in advanced tokamak. Parallel transport includes generalized ohm’s law including bootstrap current, momentum transport such as NC rotation including NTV and intrinsic rotation. Perpendicular transport includes revisited NC transport, critical gradient transport and ITB physics.

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Talk-III: 20 years of technology variation on SSTR design
Talk-IV: Power and particle control issue of Fusion Reactor

M. Kikuchi, JAEA

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In the 3rd talk, I will give an overview of 20 years of technology validation of SSTR design. This talk includes magnet technologies, blanket and material technologies, N-NBI and ECRF technology developments made during 20 years at JAEA.

In the 4th talk, I will talk about important topics on power and particle exhaust problem in the tokamak reactor design, partly addressed in my talks at WCI symposium and my plenary talk at US-EU TTF [6].