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Summary of steady-state research during 23 years of JT-60 tokamak experiments MITSURU KIKUCHI, JAEA, JT-60 TEAM — This talk summarizes the achievement of steady state research during 23 years of JT-60 tokamak experiment. JT-60 was one of 3 large tokamaks, which started its operation in April 1985 and completed in August 2008. Before the modification to JT-60U, up to 80% of plasma current was driven by the bootstrap current and the steady state tokamak reactor concept SSTR was proposed in 1990. Theory of generalized Ohm's law in tokamak was developed. Negative shear configuration was first proposed (1992) and becomes popular in advanced tokamak research now. Formation of internal transport barrier (ITB) in PS(1994) and NS(1997) leads to enhanced bootstrap current fraction in the core region. Physics of NBCD and ECCD was developed using N-NBI and ECCD systems. A current hole (CH) was observed as unique structure formation(2001). Stabilization of RWM with small toroidal rotation $\sim 0.4\%V_A$ is important step to sustain high plasma pressure above no-wall limit(2007). Demonstration of full CD with 75% bootstrap current fraction and rest by NBCD was made under relatively high $q_{95} \sim 8$ (2005) and access to low $q_{95} \sim 5$ was reached by the stabilization of RWM(2008). All these results favors the concept of SSTR, but simultaneous sustainment of high bootstrap & high beta operation is left for future study.

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