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Advances and challenges in KSTAR plasma control toward long-pulse, high-performance experiments

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An overview of advances and progress on the KSTAR plasma control improvement is given. The enhancement of the plasma control system continues in order to enable implementations of more sophisticated control algorithms and capabilities of integrated controls on magnets, gas, heating and off-normal event handling. Features and functionalities are constantly added for integration of various real-time controls that are desired for the operation space expansion, mainly regarding recent achievements of higher plasma current up to 1.0-1.2MA, high-performance long pulse up to 90s, and discharges relevant to ITER. Technical challenges on the plasma control of superconducting devices are discussed, based on experiences of KSTAR operations. Prospective upgrades and expansion of advanced control functionalities in the near future are described as well.

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