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New Small-ELM H-mode Regimes for Steady-state High-performance Operations in EAST G.S. XU, Q.Q. YANG, Y.F. WANG, N. YAN, G.H. HU, X. LIN, ASIPP, China, X.Q. XU, LLNL, USA, A.M. GAROFALO, GA, USA, R. MAINGI, PPPL, USA, EAST TEAM — A stationary high-confinement (H_{98y2}~1.1) fully non-inductive H-mode regime characterized by high-frequency (2kHz) small ELMs (divertor peak heat flux ~2MW/m^2) at relatively low pedestal collisionality (ν^*_e~1) and optimized high internal inductance (l_i~1.1) plasma has been recently achieved with high heating power (source power ~9MW) in EAST. This regime was obtained at high triangularity δ (0.55), high q_{95} (6) and high β_p (1.6), close to the parameter space of the grassy ELM regime in JT-60U. The relatively low plasma current, high q_{95}, β_p, and therefore high bootstrap current fraction (>30%) make it a suitable regime to achieve steady-state operation with low disruptivity, good reproducibility and robustness. The access to this regime is insensitive to the change of toroidal torque or plasma density in the explored parameter range. Benefiting from the optimized high l_i and high β_p, good core energy confinement has been achieved even at low core toroidal rotation (V_t down to 10 km/s). Good density control has been achieved at a line-averaged density up to 76% Greenwald. Impurity concentration and core radiation were maintained at an acceptably low level, suggesting that sufficient particle exhaust can be driven by the high-frequency small ELMs.

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