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Understanding the dynamics of the inductive plasma formation and its application to create doublet shaped plasma in the TCV tokamak JOYEETA SINHA, STEFANO CODA, BASIL PAUL DUVAL, CRISTIAN GALPERTI, JEAN-MARC MORET, HOLGER REIMERDES, Ecole Polytechnique Fdrale de Lausanne (EPFL), Swiss Plasma Center (SPC), CH-1015 Lausanne, Switzerland — The dynamics of the plasma formation in TCV are revisited with the goal of improving reliability and developing new scenarios such as the creation of doublet configurations. A database for the plasma formation scenarios in TCV reveals that 15% of the attempts to form a plasma fail during the burn-through phase. Plasma formation dynamics are greatly affected by the difference between programmed and obtained plasma current ramp rates that can lead to oscillations in I_P when the I_P feedback control is activated. This mismatch in I_P also propagates into the radial position control. Failed burn-throughs occur when the Ohmic heating power is insufficient either since I_P rises too slow or due to a combined effect of the I_P feedback oscillations and a regularly occurring MHD instability. Several strategies to improve the present plasma formation scenario have been implemented. Based on the improved understanding of the plasma formation dynamics, a strategy has been developed to create and control a doublet configuration by merging of two droplet-shaped plasma requiring simultaneous breakdown at two locations.

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