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Multiple Gas Puff Induced Improved Confinement Concomitant With Cold Pulse Propagation In ADITYA-U Tokamak. TANMAY MACWAN, HARSHITA RAJ, JOYDEEP GHOSH, SUMAN DOLUI, KAUSHLENDER SINGH, SHARVIL PATEL, NANDINI YADAV, RAKESH TANNA, SUMAN AICH, ROHIT KUMAR, KUMARPALSINH JADEJA, KAUSHAL PATEL, VIPUL PANCHAL, UMESH NAGORA, JAYESH RAVAL, MALAY CHOWDHURI, RANJANA MANCHANDA, MANOJ GUPTA, NARENDRA PATEL, DEVILAL KUMAWAT, KUMUDNI TAHILIANI, PRABAL CHATTOPADHYAY, ABHIJIT SEN, YOGESH SAXENA, Institute for Plasma Research, RABINDRANATH PAL, Saha Institute of Nuclear Physics, ADITYA-U TEAM — Multiple gas puff of H_2 and D_2 of appropriate magnitude are applied during current flat-top in ADITYA-U tokamak to study the cold-pulse propagation and effect of these puffs on plasma confinement. The results indicate the simultaneous occurrence of plasma detachment along with propagation of a cold pulse, i.e., a decrease in the edge temperature (ρ ~0.9-1.0) and an increase in the core temperature on a time-scale less than the energy confinement time, after each gas puff. Initial increase in the radiated power, H_α and CIII signals and subsequent improvement in confinement indicate plasma detachment from the limiter. The increase in energy confinement time by a factor of 2-3 is due to the density peaking along with the suppression of edge density fluctuations due to flattening of density profile in the edge due to gas puff. Both the cold-pulse and the detachment phenomena have a density threshold, i.e., above n_e ~2.7 x 10^{19} m^{-3}, no detachment and propagation have been observed.

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