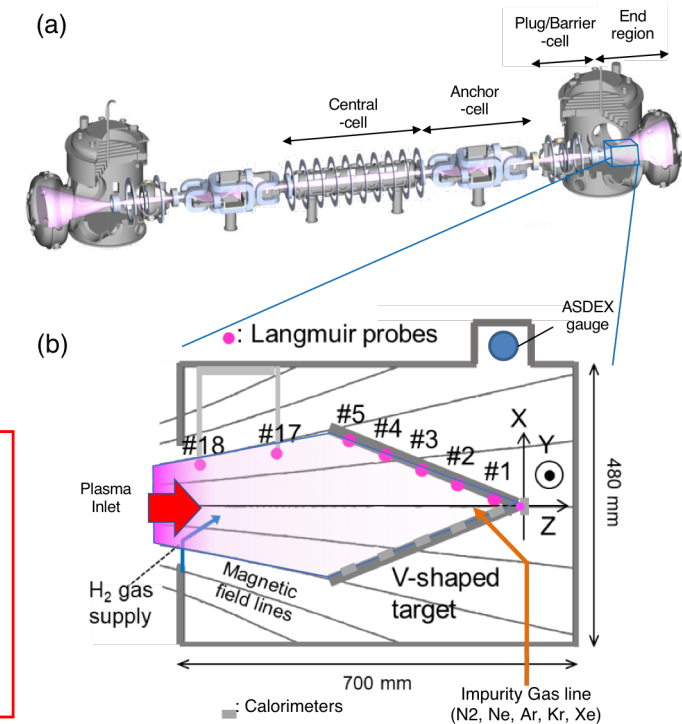


Synergistic Effect of Impurity and Hydrogen Gas Puffs on Plasma Detachment in the GAMMA 10/PDX Tandem Mirror

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- We have investigated **the synergistic effect** of a combination of various impurity gases and hydrogen gas on plasma detachment of high temperature plasma, equivalent to SOL plasma of tokamaks **in the GAMMA 10/PDX end region**, utilizing an open magnetic field configuration.
- A small puff of an impurity gas (N_2 , Ne, Ar, Kr, Xe) in combination with a puff of H_2 gas is examined to evaluate their synergistic effect on the formation of detached plasma; the following results were obtained:
 - ✓ A combination of **N_2 and H_2 puffs** showed **clear decrease of electron density and ion flux**.
 - ✓ N_2 and H_2 puffs form a strong density gradient along the axial direction.
 - ✓ Other noble impurity gases showed insufficient synergistic effect.
- The new results indicate the possibility of achieving a reliable divertor operation scheme and the **importance of deeper understanding of the H_2 and N_2 assisted recombination process**.
- We are now, in Plasma Research Center, University of Tsukuba, **preparing a new simple mirror device with a steady-state high-density plasma source & high-power heating system for contributing DEMO divertor activities**.



(c) Γ_{ion} (Probe#1)

