

Abstract Submitted  
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**Gas Puffing Experiments in Rotamak**<sup>1</sup> YURI PETROV, XIAOKANG YANG, TIAN-SEN HUANG, Prairie View A&M University — To study the particle/power balance, a piezoelectric-valve puffing system has been installed in our Rotamak. By adjusting the duration and amplitude of valve opening we studied a response of plasma parameters for cases when puffing was adding from 10% to 100% to the neutrals' inventory. For 3 ms puffing duration, the electron temperature and density could be changed by 50% during 40-ms shot. In several initial shots with puffing, the electron density increases from  $(1.0-1.3)\times 10^{12}$  up to  $2\times 10^{12}$   $\text{cm}^{-3}$  but temperature drops from 40-60 to 15-20 eV. At the following stages, density gradually decreases to original level; temperature remains low. After the puffing is turned off, plasma discharges again undergo several stages until repeatable shots are obtained. It is shown that the behavior of  $T_e$  and  $n_e$  is consistent with a global particle/power balance, although it is not sufficient to explain all observed features. An unusual experimental result is the strong response of plasma current to puffing. At the initial stages, plasma current grows from 4 to 6 kA during a shot, but at later (repeatable) stages, it experiences a sudden drop from 4 to 0.8 kA level during each shot.

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