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Non-linear response of Hall thruster plasma to modulation of the discharge voltage.[1] YEVGENY RAITSES, IVAN ROMADANOV, Princeton Plasma Phys Lab, ANDREI SMOLYAKOV, University of Saskatchewan, Canada — For cylindrical Hall thrusters, naturally occurred breathing oscillations have a characteristic frequency of ˜13 kHz. The external modulation of the anode potential was applied to make this mode coherent. To determine the driving frequency, a set of natural frequencies was defined from the Fourier transform of the discharge current and the ion current in the plume. By varying driving frequency in the range of 5-20 kHz and monitoring the power spectra of the currents, we found that the coupling of the driving frequency to the intrinsic breathing mode is at frequency of this mode ˜13 kHz rather than at the driving frequency. More than that, with the increase of the driving voltage, there is a non-linear response of the discharge current and the ion current as well as a shift of the breathing mode to lower frequencies. We will discuss this interesting non-linear behavior of breathing oscillations in response to driving signal.

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