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A continuous dual ion beam formed by successive acceleration of positive and negative ions[1] ANE AANESLAND, LARA POPELIER, DENIS RENAUD, PASCAL CHABERT, CNRS - Ecole Polytechnique — The distinctive feature of the PEGASES thruster is that both positive and negative ions are accelerated to provide thrust such that an additional neutralization system is redundant; the accelerated product provides the space charge and current neutralization of the beam. The first proof-of concept of the alternate acceleration has recently been achieved. The ions are accelerated from an ion-ion plasma by a set of grids where the grid in contact with the plasma is biased with square voltage waveforms with frequencies in the kHz range and voltages less $\pm$500 V. Time resolved measurements show that the positive and negative ions are extracted at the positive and negative bias period, respectively, producing a continuous beam of ions. For positive ions, the beam energy corresponds to the sum of the applied acceleration voltage and the plasma potential. For negative ions, the beam energy is lower than the applied voltage and depends on the applied bias frequency. The effects of the voltage waveform and the grid surface condition on the resulting beams are discussed.

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