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Plasma jets generated by a 1-kJ pulsed-power system[1] PO-YU CHANG, MING-CHENG JHENG, CHIH-JUI HSIEH, MEI-FENG HUANG, SHENG-HUA YANG, National Cheng Kung University, I-LIN YEH, National Cheng Kung University; University of California San Diego — Plasma jets will be generated by using a 1-kJ pulsed-power system to study space sciences, particularly in simulating solar winds. Plasma jets are generated by using conical-wire arrays driven by the pulsed-power system using a parallel-plate capacitor bank. The system consists of twenty 1-uF capacitors. Two capacitors are first connected in series forming a brick. Five bricks are connected in parallel forming a wing. Finally, two wings are connected in parallel and connected to the high-voltage feedthrough at the bottom of the vacuum chamber via parallel-plate transmission lines. Therefore, the total capacitance of the system is 2.5 uF storing 1 kJ of energy when it is charged to 20 kV. One rail-gap switch is used in each wing. Each switch is triggered by a trigger pulse with peak voltage less than -50 kV with a falling speed of -8+-1 kV/ns generated from a 3-stage Marx generator. Discharge of a single wing provides a peak current of 59.2+-0.7 kA with a rise time of 1280+-10 ns with a jitter of 11 ns. We are expecting a total current of 120 kA with a similar rise time, i.e., a power of 800 MW, when the system is built in Summer, 2019. Finally, the current output of the pulsed-power system and time-integrated images of plasma jets generated by conical-wire arrays will be shown.

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