

Generating of a toroidal plasma vortex in the atmosphere by electrical exploding of copper wires using a water seal

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Generating of a toroidal plasma vortex in the atmosphere was carried out using a pulse plasmatron containing a vertically located semi-open cylindrical chamber with a diameter of 90 mm and a height of 60 mm. Electrodes were located at the bottom of the chamber and on its side surface, to which 32 electrically exploded copper wires were attached. The wires were installed so that they could create a toroidal magnetic field with an amplitude value of magnetic induction of about 2 T. Water was poured onto the bottom of the chamber so that the ends of the electrically exploded wires were covered with a layer of water about 5 mm thick. The electrodes were connected via a thyristor switch to a 1 F capacitor bank charged to 400 V. During the experiments, an electrical exploding copper wires was carried out, with the peak current reaching about 400 kA. In this case, due to the water seal, a shortened trailing edge of the current pulse was provided, amounting to about 50 microseconds. This contributed to the additional introduction of energy into the plasma vortex due to the induction discharge under the action of the trailing edge of the rapidly decaying toroidal magnetic field. As a result, a toroidal plasma vortex with increased luminosity with a lifetime of about 100 ms was generated.