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## Magnetron Discharge-Based Boron Ion Source

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An ion source was designed utilizing a planar magnetron with 2-inch diameter pure boron target. The discharge can operate both in DC and pulsed mode. Boron as a semiconductor has low conductivity at a room temperature, which still is sufficient to start low-current (2 mA) high-voltage (2000 V) DC discharge. Due to the target heat insulation, it gradually rises the temperature to 300 °C and more, enabling to apply high-current pulses to the discharge gap. An improved time-of-flight methodic was used to measure the ion species in the plasma and the beam. The ion composition of plasma was examined within a wide range of DC and pulse parameters: pulse duration of 5 - 250  $\mu$ s, repetition rate of 20 - 5000 Hz, pulse current up to 100 A. It was shown that boron ions are mostly singly ionized, and their fraction may exceed 95% at certain conditions. The rest sort of ions are singly and doubly charged working gas ions (argon or krypton were used). The work was supported by the Russian Science Foundation under grant # 16-19-10034.

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