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Observation of plasma microwave emission during the injection of supersonic plasma flows into magnetic arch[1] MIKHAIL VIKTOROV, DMITRY MANSFELD, ALEXANDER VODOPYANOV, SERGEY GOLUBEV, The Institute of Applied Physics of the Russian Academy of Sciences — Understanding of the energy transfer mechanisms from supersonic plasma flow into the thermal energy of plasma, waves and accelerated particles in the environment of planetary bow shocks and interplanetary shocks have been topical for many decades. Almost all mechanisms of energy dissipation in collisionless shock waves end with microscopic processes involving wave-particle interactions. Excitation of plasma waves in electron cyclotron frequency range plays an important role in the dissipation of bulk flow energy across the Earth bow shock. In the present work, the process of plasma deceleration during the injection of supersonic plasma flow across the magnetic field of an arched configuration is experimentally demonstrated. Pulsed plasma microwave emission in the electron cyclotron frequency range is observed. It is shown that the frequency spectrum of plasma emission is determined by the position of the deceleration region in the magnetic field of the magnetic arc and its bandwidth is defined by the magnetic field inhomogeneity in the deceleration region. The observed emission can be related to the cyclotron mechanism of wave generation by non-equilibrium energetic electrons in the dense plasma, especially excitation of electron Bernstein waves.

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