

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Magnetic field effect on spoke behaviour¹ JAROSLAV HNILICA, MARTA SLAPANSKÁ, PETER KLEIN, PETR VASINA, Masaryk University — The investigations of the non-reactive high power impulse magnetron sputtering (HiPIMS) discharge using high-speed camera imaging, optical emission spectroscopy and electrical probes showed that plasma is not homogeneously distributed over the target surface, but it is concentrated in regions of higher local plasma density called spokes rotating above the erosion racetrack. Magnetic field effect on spoke behaviour was studied by high-speed camera imaging in HiPIMS discharge using 3 inch titanium target. An employed camera enabled us to record two successive images in the same pulse with time delay of $3\ \mu\text{s}$ between them, which allowed us to determine the number of spokes, spoke rotation velocity and spoke rotation frequency. The experimental conditions covered pressure range from 0.15 to 5 Pa, discharge current up to 350 A and magnetic fields of 37, 72 and 91 mT. Increase of the magnetic field influenced the number of spokes observed at the same pressure and at the same discharge current. Moreover, the investigation revealed different characteristic spoke shapes depending on the magnetic field strength - both diffusive and triangular shapes were observed for the same target material. The spoke rotation velocity was independent on the magnetic field strength.

¹This research has been financially supported by the Czech Science Foundation in frame of the project 15-00863S.

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Date submitted: 27 Jul 2016

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