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Development and investigation of a pulsed screw pinch for the application as a FAIR plasma stripper[1] MARCUS IBERLER, THILO ACKERMANN, BENJAMIN BRUENNER, FIONA FABER, CHRISTIAN HOCK, JOERG WIECHULA, JOACHIM JACOBY, Goethe University Frankfurt, Institute for Applied Physics — The purpose of this work is to study a combination of a Z- and a Theta-Pinch Plasma with a dynamic external magnetic field generated by a coil integrated into the discharge circuit. The coil is serially connected with the generated plasma and the pulse forming network. The maximum energy used for the experiment is 5 kJ. The axial and azimuthal fields oscillate with the changing current. So, one goal is to study possible synergy effects between the magnetic fields and the efficiency concerning the magnetic pressure. Furthermore, the density and charge state of the resulting plasma are of interest for possible application as a FAIR Plasma stripper. The pinch plasma is generated by a capacitive hollow cathode discharge. To achieve the interaction between the magnetic fields, a coil is wrapped around the discharge chamber. This way the current, first running through the coil, then as an arc discharge through the chamber, is responsible for both the z- and theta-pinch portions of the screw pinch. The first experiments are made to the left of the Paschen minimum using the breakdown voltage. This work focuses on the optical analysis of the plasma to determine the plasma parameters. A fast shutter camera is used for the spatial resolution of the plasma. In addition time resolved and time integrated spectrographic measurements are made to examine plasma temperature, density and charge state.

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