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Confirmation of helicon mode at IShTAR plasma source[1] MOHAMMAD FOISAL BIN TOUHID SIDDIKI[2], Ghent University, Belgium, ILYA SHESTERIKOV, Max-Planck-Institut fr Plasmaphysik, Garching, Germany, JEAN-MARIE NOTERDAEME, Ghent University, Belgium Max-Planck-Institut fr Plasmaphysik, Garching, Germany, KRISTEL CROMB, Ghent University, Belgium — IShTAR (Ion Sheath Test ARrangement) is a dedicated test facility to investigate the interaction of ICRF wave and plasma at the Max-Planck Institute for Plasma Physics in Garching, Germany. Plasma is provided by a plasma source (length= 0.1m, diameter = 0.4m) equipped with a helical type antenna. This source is designed to achieve helicon mode of discharge and can only work with its full capacity if the source reaches helicon mode. However, previously there was no confirmation that this plasma source can attain helicon mode and the main objective of this work was to achieve the helicon mode of discharge for this source. Plasma characteristics (electron density, electron temperature, plasma potential) at different operating conditions (gas pressure, power) were measured with an RF compensated single Langmuir probe. To understand the plasma behaviour and to validate the experimental results a global model of particle and power balance was implemented. Experimental electron density and electron temperature are in good agreement with the model results while plasma potential shows discrepancy at higher gas pressure. From power balance, it was found that absorption of power is high at lower magnetic fields (<35mT) than higher magnetic fields (>35mT). The density plot as a function of power also shows helicon type transition at lower magnetic fields (<35mT). This indicates the presence of helicon mode of discharge at IShTAR plasma source when it is operational at low magnetic fields. To get the highest density of plasma, the optimization of the plasma source is presented to reach helicon mode at the highest available magnetic field.

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[2]I did this work as a student of Ghent University for my masters thesis but currently I am not.

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