

Development and plasma physical investigation of a plasma window for the generation of high pressure differences

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A plasma window (PW) is a device for separating two areas of different pressures while letting particle beams pass with little to no loss.

It has been introduced by A. Hershcovitch.

In the course of this talk, the properties of a PW with apertures of 3.3 and 5.0mm will be presented which was investigated during my PhD thesis.

As working gas, a 98%Ar-2%H₂ mixture has been used due to the intense Stark broadening of the H_β-line and the well-described Ar characteristics, enabling an accurate electron density and temperature analysis.

At the low pressure side around some mbar, high-pressure values reached up to 750mbar while operating with volume flows between 1slm and 4slm (standard liter per minute) and discharge currents ranging from 45A to 60A.

The achieved ratios between high and low pressure with an active discharge range from 40 to 150.

This is an improvement of a factor up to 12 over the performance of an ordinary differential pumping stage of the same geometry.

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