

## **Application of Optical Emission Spectroscopy to Hydrogen plasmas for proton rich plasmas generation**

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The evaluation of the electron density and proton fraction of hydrogen plasmas has a relevant importance for plasma traps used as sources of intense proton,  $H_2^+$  or  $H_3^+$  beams. Optical Emission Spectroscopy (OES) enables to evaluate simultaneously and on-line the H/H<sub>2</sub> relative abundances together with plasma and electron temperature. In this work, the experimental results of the OES measurements on the Proton Source of the European Spallation Source plasma has been related to the properties of the ion beam extracted by the source (proton fraction and beam intensity, in particular). Benefit of the diagnostics and the further improvements foreseen in next future will be highlighted.