Plasma diagnostics for the ESS Proton Source

G. Castro[1], L.Celona[1], M. Mazzaglia1, D. Mascali[1], A. Miraglia[1], O. Leonardi[1], E. Naselli[1,2], L. Neri[1], R. Reitano[1,2] G. Torrisi[1] and S. Gammino[1]

[1] *INFN – Laboratori Nazionali del Sud, Catania, Italy*

[2] *Università degli studi di Catania, Catania, Italy*

The high intensity proton source for the European Spallation Source, designed and commissioned at INFN-LNS, is able to produce a stable total current between 40 and 125 mA through an 8 mm extraction aperture, with a proton fraction up to 87%. PS-ESS performances are function of the characteristics of the plasma generated within it. Therefore, plasma diagnostics plays a key role for comprehension of the heating mechanism and for further upgrades of proton sources. In this work, we used Optical Emission Spectroscopy (OES) to evaluate simultaneously the H/H_2 relative abundances together with plasma and electron temperature in the best operative condition found during commissioning. Results from OES plasma diagnostics are discussed and compared with results from beam diagnostics, performed by Faraday-cup and Doppler shift measurement. Benefit of OES diagnostics and perspectives will be also highlighted.