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## Langmuir Probe Characterization of the NIO1 Ion Source Plasma

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In view of the future experiments on the large ion sources used for the neutral beam injection system of ITER and DEMO reactor, a small scale negative ions source called NIO1 (Negative Ion Optimization, phase 1) is operated at Consorzio RFX since 2014 [1], [2]. At this stage  $H^-$  are mainly formed by volume processes, while the use of cesium vapour to enhance the surface production is foreseen in a second stage. The plasma is sustained by a 2.5 kW RF generator, inductively coupled via a seven turn coil surrounding the plasma chamber. The production and survival of negative ions strongly depends on the plasma properties in the vicinity of the apertures from which particles are extracted and a beam is formed. In order to characterize these properties against the variable pressures, power electric and magnetic field strength in the source a dedicated campaign with a movable Langmuir probe immersed in the plasma was carried out. This paper firstly reports on the installation of such probe on NIO1 and on the development of its control and acquisition system. The data acquired in different source conditions are then presented and discussed.

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### References

- [1] M. Cavenago et. al., Construction of a versatile negative ion source and related developments, AIP Conf. Proc. 1515, 157 (2013).
- [2]. M. Cavenago et. al., Improvements of the Versatile Multiaperture Negative Ion Source NIO1, NIBS 2016 conference proceedings.

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