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## P2.019 Experimental experience and improvement of NIO1 negative ion sources.

*Tuesday, 18 September 2018 11:00 (2 hours)*

The ion source NIO1 (Negative Ion Optimization 1) is a versatile multiaperture H<sup>-</sup> source capable of continuous regime operation, with the plasma generated by a 2 MHz/2.5 kW radiofrequency (rf) power supply and nine beamlet extraction. It aims to partly reproduce the conditions of the much larger ion sources built or in construction for neutral beam injectors of fusion devices in a compact and modular ion source, where effects of individual source components can be rapidly verified and compared to simulation code results.

Several modifications of the magnetic configuration (both inside the ion source and for the embedded magnets inside the accelerator grids) were investigated, with material ranging from hard ferrite to SmCo to NdFeB; evidence of the effect of the accelerator fringe field inside the ion source is discussed. Saturation of filter field beneficial effect at large (>100 G) amplitudes is discussed, as well as the advantages of crossed field operation. The radiofrequency system takes full advantage of the frequency tuning amplifier capability (+/-150 kHz installed, 0/+20 kHz used), and it is worth noting that no adjustment of matching box capacitors was necessary in the last 3 years.

Major diagnostic systems (including CCD cameras and BES measurement) have been integrated with the acquisition system along with the data measured by several power supplies (including the high voltage supplies, the rf generator and bias supplies, the pressure measurements and the beam currents).

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