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The H^- Multiaperture Source NIO1: Conditioning and First Cesiations

Observation of a transient, in Cs-free regime and long term NIO1 operation, led to the development of stabilization techniques, including conditioning (with oxygen or other gases, as argon, nitrogen, and xenon), interleaved with days of use of H_2 as a process gas. Stabilization of transients gave more H^- current and less plasma luminosity. After installation of a cesium oven, some additional increase (up to a factor of 2 reaching an average about 50 A/m^2) of current was observed, but effect saturates at a moderate oven reservoir temperature. Obtained beam optics will be compared with theoretical expectation and old results in the Cs-free regime in similar conditions (as source voltage, often set to 11 kV). In both regimes, central beamlet apparent density is larger, possibly because a bias plate BP mask reduces side ones. Further improvements including long term conditioning of oven, modification of BP mask and of Cs pipe nozzle (with supporting simulations) are discussed.

E-mail for contact person

marco.cavenago@lnl.infn.it

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Primary authors: CAVENAGO, Marco (INFN-LNL); BARBISAN, Marco (Consorzio RFX); DELOGU, Rita Sabrina (Consorzio RFX); PIMAZZONI, Antonio (Consorzio RFX); POGGI, Carlo (Consorzio RFX); UGOLETTI, Margherita (University of Padua); VARIALE, Vincenzo (INFN - Bari)

Co-authors: ANTONI, Vanni (Consorzio RFX, e CNR); Dr RAVAROTTO, Diego (Consorzio RFX); SERIANNI, Gianluigi (Consorzio RFX); BALTADOR, Carlo (CNR - Consorzio RFX); FRANCHIN, Luca (Consorzio RFX); MARTINI, Denis (INFN-LNL); MANIERO, Moreno (Consorzio RFX); MINARELLO, Alessandro (INFN-LNL); RIZZIERI, Roberto (Consorzio RFX); ROMANATO, Livio (Consorzio RFX); ROSSETTO, Federico (Consorzio RFX); TACCOGNA, Francesco (CNR)

Presenters: CAVENAGO, Marco (INFN-LNL); BARBISAN, Marco (Consorzio RFX)

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