

Status of NIO1 construction and related simulations

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The NIO1 (Negative Ion Optimization phase 1) project consists in a multiaperture negative ion source mounted on a 60 kV accelerating column; up to 9 beamlets (15 mA H^- each one) arranged in 3 x 3 matrix with 14 mm spacing can be extracted. The moderate size and the modular concept make some relative rotation of source magnetic filter and electrode possible, so that the effect of crossed and aligned field can be easily compared. Other goals of source experimental program are emittance (and beam profile) measurement at several distances (for BYPO and other code validation), testing of diagnostic components and of radiofrequency coupling. A full set of construction drawing was completed; also the fast emittance scanner (FES) and its vacuum chambers were built (four mounting positions are reserved to FES). Some low power rf matching box was tested on a test plasma, approximately half the source size; effect of low level magnetic field on source plasma is not as large as indicated by simulations. A cesium oven compatible with NIO1 is being also developed; by using 5 industrial standard 100 W heaters (with a proper proportional driver) a careful control of temperature is planned. Thermal and hydraulic simulations are also described.

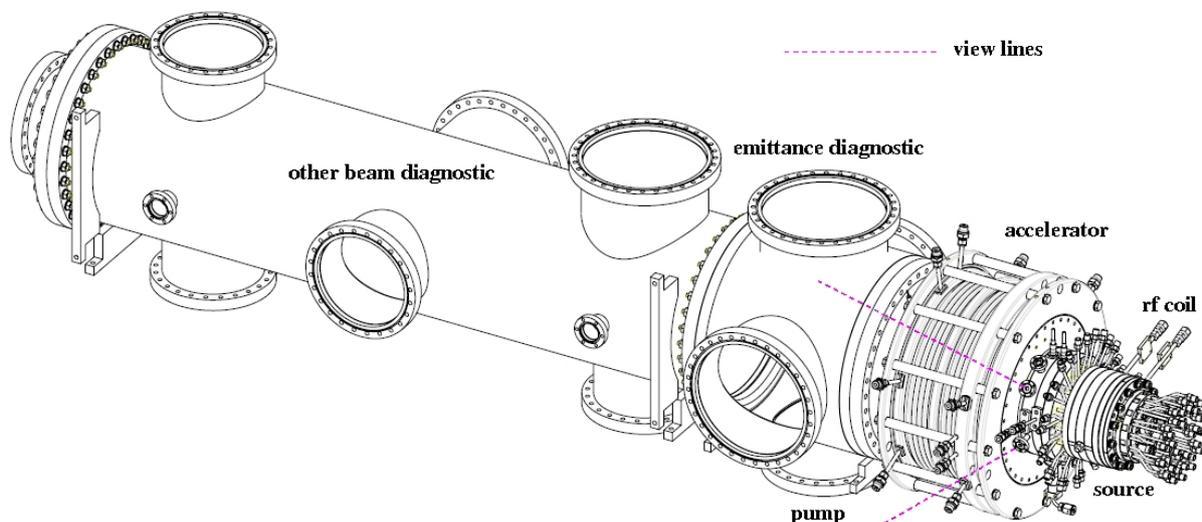


Figure 1: NIO1 global setup, composed by the source, the accelerator, a multipurpose cross and a 1.5 m long tube where a beam dump can be fitted. Accelerator insulator are sealed by O-ring; support not shown. The emittance meter flanges are CF250 size, the pump flanges are CF200 size.