The dependence of extracted current on discharge gas pressure in neutral beam ion sources on HL-2A tokamak

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(Received 12 October 2011; accepted 13 January 2012; published online 7 February 2012)

The discharge gas pressure is a key factor to influence the extracted current of ion source. In this paper, the dependence of extracted current on discharge gas pressure was investigated in detail at different arc discharge currents. The discharge gas pressure with a very broad range (0.1 Pa–2.7 Pa) was scanned for the first time. It is turned out that, with the increasing of discharge gas pressure, the extracted current increases and the arc voltage decreases at different arc currents; however, when the discharge gas pressure exceeds a certain value, the extracted current decreases. For the same discharge gas pressure, the higher the arc current, the higher the arc voltage and the extracted current are. The arc efficiency was also calculated, and its dependence on gas pressure was almost the same with the dependence of extracted current on gas pressure, but at the same discharge gas pressure, the lower the arc current, the higher the arc efficiency is and the lower the extracted current is. [doi:10.1063/1.3681446]