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Long-Term Performance of CW Negative Hydrogen Ion Source at BINP Tandem Accelerator

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An 8 mA CW surface-plasma negative hydrogen ion source [1] has been routinely used during last decade for proton beam production at 2 MeV vacuum insulation tandem accelerator at the Budker Institute of Nuclear Physics. Continuous 4–6 hours dc runs of the source were regularly produced, and proton beam with current > 5 mA was accelerated [2].
The source uses the hydrogen-cesium Penning discharge with plasma injection from hollow cathodes. The negative hydrogen ions are produced due to surface-plasma mechanism on the anode electrode, covered by cesium, and are accelerated with the triode ion-optical system. It is important to note, that the only one source unit was used during the indicated ten-year period, and only a few upgrades of the source construction with replacement of the worn elements were made. Data on source performance, upgrades and maintenance statistics during long term exploitation will be presented and discussed.

References

[1] Yu. Belchenko, A. Sanin, I. Gusev, et. al., Rev. Sci. Instrum., vol.79, 02A521, (2008).

[2] A.A. Ivanov, D.A. Kasatov, A.M. Koshkarev, A.N. Makarov, Yu.M. Ostreinov, I.N. Sorokin, S.Yu. Taskaev, I.M. Shchudlo, Technical Physics Letters, 2016, Vol. 42, No. 6, pp. 607–610.

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