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**Liquid Metal Ion Source Assembly for External Ion Injection into
Electron String Ion Source (ESIS) and Charge Breeding Efficiency
Measurements**

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The Electron String Ion Source (ESIS) is basically a modified Electron Beam Ion Source (EBIS) and they both were first proposed, developed and used in JINR for efficient production of intense beams of highly charged ions^{1,2}. ESIS-type ion sources have various attractive advantages which are proven with the injection of neutral gases and neutral atoms of some metals into the ESIS. However, for charge breeding and study of rare ion beams or short-lived isotopes that are produced in nuclear reactions, external injection of corresponding 1+ ion beams into ESIS is required.

An assembly for a commercial Ga⁺ liquid metal ion source (LMIS) in combination with an ion transportation and focusing system, a pulse high-voltage quadrupole deflector and a beam diagnostics system has been constructed in the framework of the iThemba Labs (Cape Town, South Africa) – JINR (Dubna, Russia) collaboration. First results on Ga⁺ ion beam commissioning will be presented. Outlook of further experiments for measurements of charge breeding efficiency in the ESIS with the use of external injection of Ga⁺ and Au⁺ ion beams will be reported as well.

References:

¹E.D. Donets, et al., Rev. Sci. Instrum., Vol. 75, 1543-1545 (2004)

²E.D. Donets, et al., Rev. Sci. Instrum., Vol. 83, No 2, Part 2, 02A512 (2012)