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## **Production of high current proton beams using complex H-rich molecules at GSI**

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The operation of the linear accelerator UNILAC at GSI heavy ion accelerator facility with light ions ( $M/Q < 8$ ) is strongly limited due to high transmission losses in the low energy beam transport line (LEBT) and RFQ. Another limitation is the low extraction voltage applied at the ion source due to the fixed specific ion energy of 2.2 keV/u at the RFQ entrance. These factors make the operation of the high current injector (HSI) with proton beams extremely inefficient. However the situation can be dramatically improved by production of singly charged molecular heavy (up to  $M = 50$  a.m.u.) ion beams with a high content of hydrogen atoms. These molecular ions can be extracted from ion source and accelerated in the HSI with much lower transmission losses while an intense proton beam is available after conversion in the gas stripper. In this work first experimental results of high intensity proton beam production at GSI UNILAC using  $\text{CH}_3^+$  molecular beam from the ion source are presented. The selection of appropriate H-rich molecules and corresponding substances for ion source operation is discussed. The performance of volume type high current ion sources with various gases (methane, ethane, propane and isobutane) as well as with liquid substances (iodoethane) has been investigated and results are summarized. Further steps to improve the ion source performance with molecular beams and to increase the yield of protons behind the gas stripper will be depicted.