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**Latest developments of gas ionization chambers for AMS and IBA applications**

Gas ionization chambers (GIC) have a wide range of applications in Accelerator Mass Spectrometry (AMS) as well as in Ion Beam analysis (IBA) to identify and count single ions or to determine projectile energies. In the past two decades the performance of these detectors could be significantly improved especially at energies below 1 MeV. Alternatively solid state detectors are used, which offer a much easier handling and in general a better energy resolution for very light ions such as H or He. Radiation damage and limited resolution for heavy ions are here drawbacks. Recently various experiments have been conducted at ETH Zurich with GICs operated in the proportional mode. The detector signal is amplified in the gas by creating an avalanche of secondary electrons. This way the limitation of the energy resolution due the electronic noise could be overcome and even protons below 10 keV were detected with less than 1.5 keV energy resolution. On the other hand, operating a GIC in proportional mode is quite challenging in terms of signal stability, since slight contaminations of the gas or changes of the electric field will affect the yield of secondary electrons. An overview on the different aspects of running a GIC in the proportional mode will be given in this presentation.

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