



NUSTAR Seminar

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“The FAIR MUSIC Detector”

The ΔE detectors are used to identify the charge number Z of the ion by measuring the energy losses of the particle in the detector material. In case of relativistic heavy ions flying through a magnetic separator like the Super-FRS gas detectors represent the most suitable choice because of the good energy resolution and robustness against beam bombardment.

A gas filled detector like a MUSIC (MULTI Sampling Ionization Chamber) is capable to measure energy resolution as good as a semiconductor detector. In addition, these detectors are easier to realize in large-scale compared to the other ones.

The ΔE detector of the Super-FRS can provide the unambiguous charge identification of the ion flying through the separator. At FAIR energies the ions are usually fully stripped and $Q = Z$. For high Z nuclei (above Au) charge recombination inside of the gas can lead to a Z misidentification.

This effect becomes more important when the energy becomes lower (0.8 GeV/u downwards). To identify cases of wrong Z assignment (Q not equal to Z) a common technique is to have a stripper foil in between two gas volumes. The stripper will then reset the charge state equilibrium of the incoming ion, permitting a second charge measurement.

The Z of the ion is then assigned as being the maximum of the Q between each volume. Although this reduces the proportion of misidentification it will increase matter and add to angular and energy straggling of the ion beam.

The ongoing design of the Super-FRS MUSIC detector and electronics will be presented.

Convener: Timo Dickel

Secretary: R. Krause / D.Press

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