Application of Micromegas in hadronic calorimetry

The hadronic calorimeter of an ILC detector should be compact, highly segmented and have a total active area of about 3000 m2. Bulk Micromegas chambers with 1 cm2 anode pads and single bit readout per channel have been proposed to instrument this area. Thanks to the manufacturing process frontend electronics is connected directly on the backside of the pad plane resulting in 8 mm thin chambers of large area.

Chambers equipped with charge readout electronics were used for extensive characterisation with X-rays and beam particles. Signal distribution, efficiency, pad multiplicity, pressure and temperature dependence, electronic threshold dependence were determined. For the first time, the behaviour of a small Micromegas calorimeter in electron and hadron showers was investigated by measuring shower longitudinal and transverse profile.

In view of the construction of a digital HCAL for ILC, 32 x 48 cm2 boards equipped with self-triggered chips with power pulsing capability and a Micromegas Bulk were fabricated. Measurements of efficiency and pad multiplicity were performed in a beam at the CERN/PS and will be shown. Next year, six boards will be placed in a single gas chamber of 1 m2 which should serve as the basis of a 1 m3 DHCAL made up of 40 planes. The assembly of the 1 m2 chamber will be described and first bench tests will be presented.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://lappweb.in2p3.fr/~chefdevi/Work_LAPP/Vienna_conference_abstract/Short_description/micromegas_calorimetry_vienna.pdf

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