Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

X-ray GEM Detectors for Burning Plasma Experiments S. PUDDU, Universita di Cagliari, F. BOMBARDA, G. PIZZICAROLI, ENEA, F. MURTAS, INFN-LNF, Italy — The harsh environment and higher values of plasma parameters to be expected in future burning plasma experiments (and even more so in future power producing fusion reactors) is prompting the development of new, advanced diagnostic systems. The detection of radiation emitted by the plasma in the X-ray spectral region is likely to play the role that visible or UV radiation have in present day experiments. GEM gas detectors, developed at CERN, are the natural evolution of Multiwire Proportional Chambers, with a number of advantages: higher counting rates, lower noise, good energy resolution, low sensitivity to background radiation. GEM's can be used in several different ways, but two specific applications are being explored in the framework of the Ignitor program, one for plasma position control and the other for high resolution spectroscopy. The diagnostic layout on the Ignitor machine is such that the detectors will not be in direct view of the plasma, at locations where they can be efficiently screened by the background radiation. Prototype detectors 10×10 cm^2 in area have been assembled and will be tested to assess the optimal geometrical parameters and operating conditions, regarding in particular the choice between Single and Triple GEM configurations, the gas mixture, and the problem of fan-out associated with the high number of output channels required for high resolution crystal spectrometers.

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Date submitted: 16 Jul 2009 Electronic form version 1.4