

Abstract Submitted  
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**A Study of the Impact of the GEM Foil Leakage Current to Gains**<sup>1</sup> HEATHER BROWN, CHANGHIE HAHN, WONJEONG KIM, JIA LI, CARLOS MEDINA, AKIHIRO NOZAWA, JACOB SMITH, ANDY WHITE, JAEHOON YU, UTA High Energy Physics Group — Many factors affect the amplification factor or gain and performance of the GEM chambers. GEM foil is one of the core component technologies of the conceptual digital hadronic calorimeter (DHCAL). The GEM chamber amplifies electric signal from traversing charged particles using high electric field applied across the foil and a mixture of gas as the medium to provide ionization electrons. This study focuses specifically on the reduction in gain of the chamber due to the leakage current in GEM foils under the high voltage, since understanding the relationship between these two parameters is essential for optimal performance of the chamber. We will be highlighting the chain of relationships leading to the final correlation between leakage current and the gain. Ultimately, we present what the impact of a few nano-amperes of leakage current to the total gain of the GEM chamber. We will present how the findings from this study results in improvement of the chamber design.

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