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Extremely fine grained electro-magnetic calorimeter

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Calorimetry at small forward angles at the LHC poses several challenges. The particle density is very high, especially in Pb-Pb. Further, in the electromagnetic case the discrimination of photons and π^0 requires extremely fine granularity due to the small angle between the decay photons of the pion.

We present a design of a silicon - tungsten calorimeter with Monolithic Active Pixels as sensing element. With a Moliere radius of pure tungsten of 9 mm it seems overkill to use pixels of 30 .. 100 μm size. However, in the preshower phase this spatial resolution is helpful. The small pixelsize allows to count pixels to obtain the energy signal without the problem of saturation. Due to the on chip digitization a longitudinal read-out every radiation length becomes feasible.

Simulations have shown that a spatial resolution of better than 1 mm can be achieved, together with a moderate energy resolution.

A full depth (20 radiation length) prototype will be put in the testbeam later this year.

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