

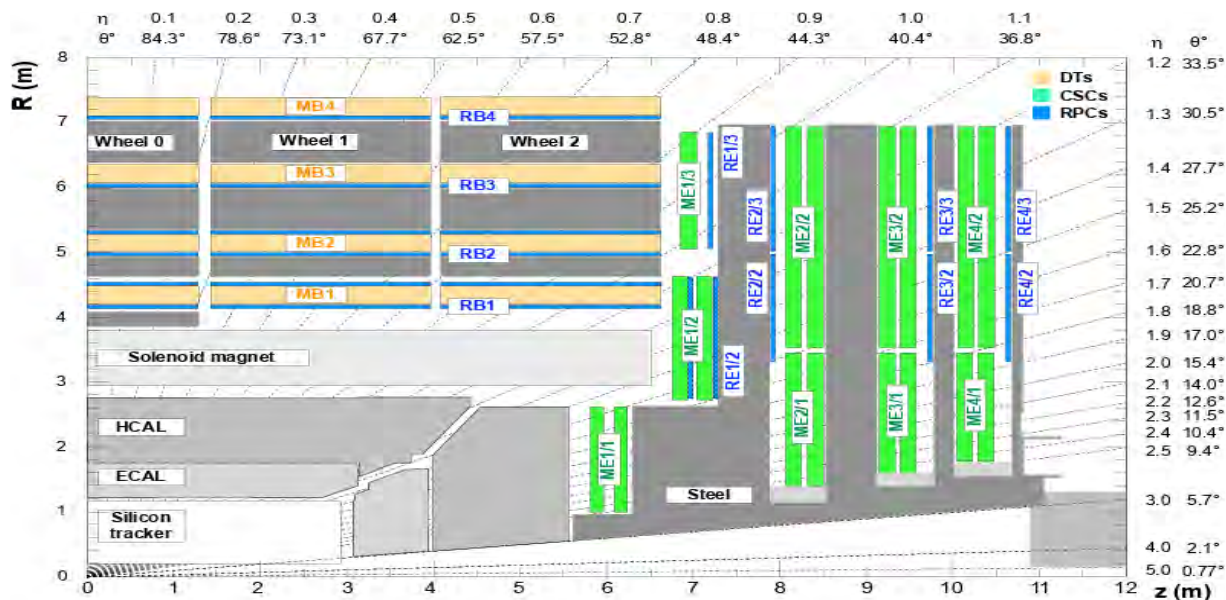
HIT RECONSTRUCTION ENHANCEMENT IN THE CATHODE STRIP CHAMBERS OF THE CMS EXPERIMENT

VLADIMIR PALICHIK, NIKOLAY VOYTISHIN

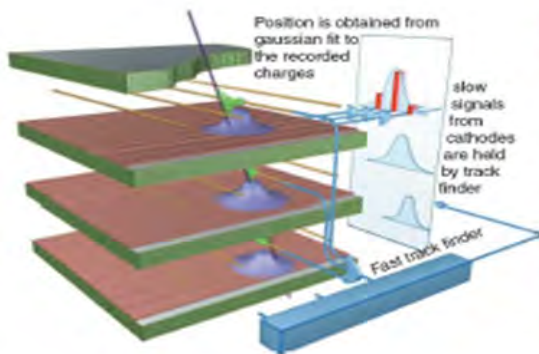
Meeting of the Programme Advisory Committee
for Particle Physics

January 25, 2022

CATHODE STRIP CHAMBERS @ CMS



Cathode Strip Chambers in the experimental setup



2D points

- > ϕ coordinate measured by charge distribution on strips (fit with the Gatti function)
- > R coordinate measured by wires

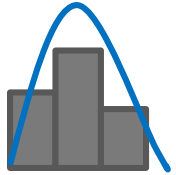
3D segments

Determined by fitting the 2D points from the 6 layers of each chamber

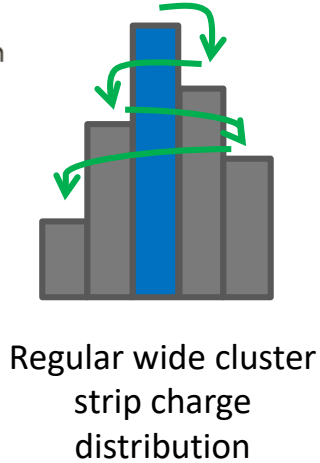
Reconstruction in CSC

TWO OVERLAPPING SIGNALS RECOGNITION

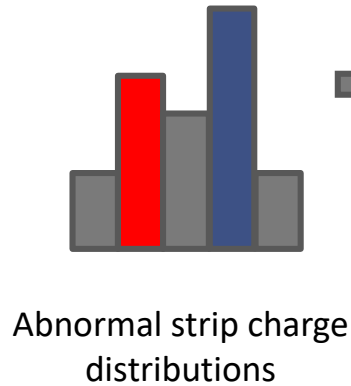
$\sigma_{Gatti_fit} \sim 2\%$ of strip width



Regular strip charge distribution



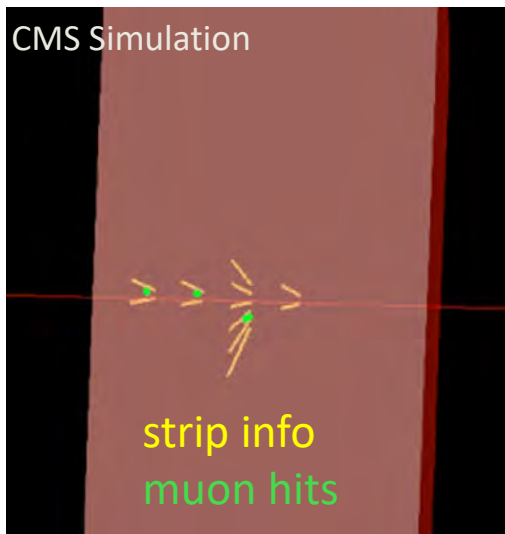
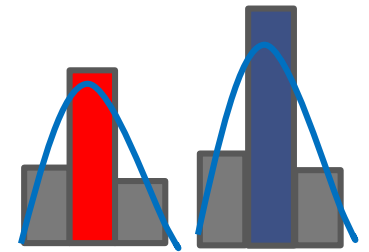
Regular wide cluster strip charge distribution



Abnormal strip charge distributions

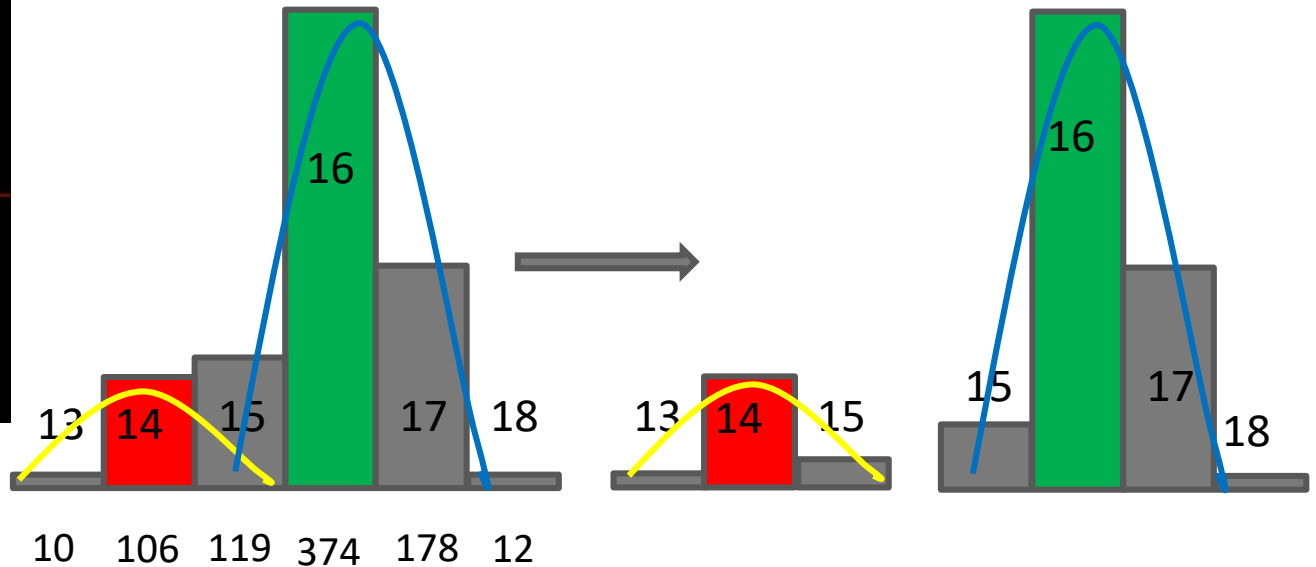


Make two maxima and divide the charge of the common strip proportionally



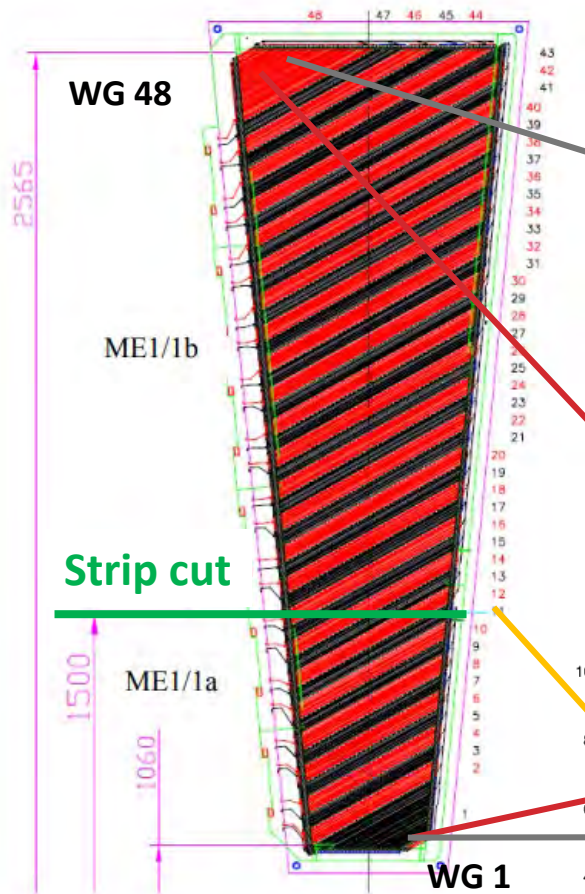
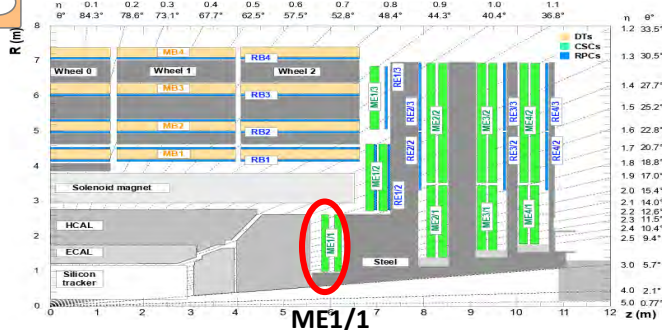
Event example

Strip ADC's

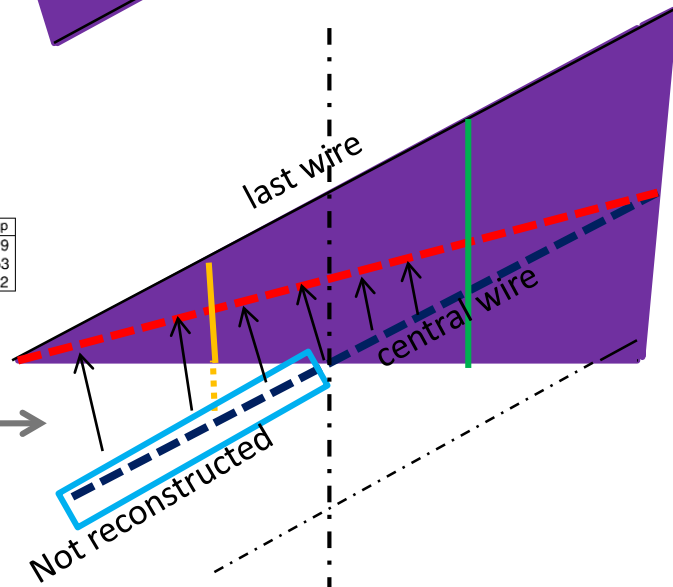
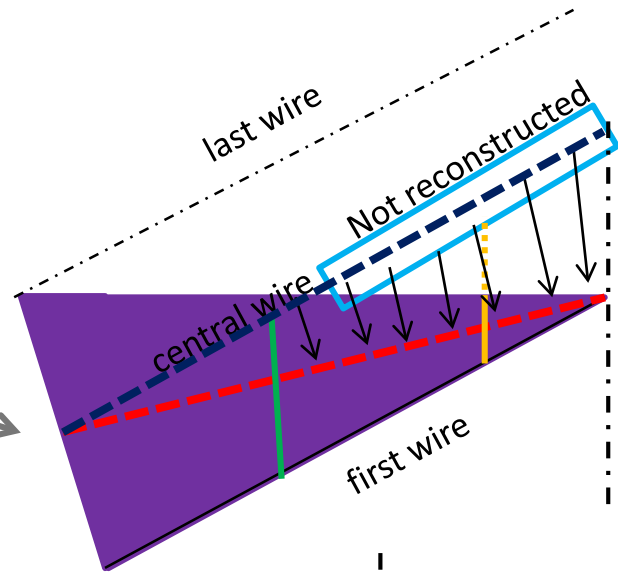
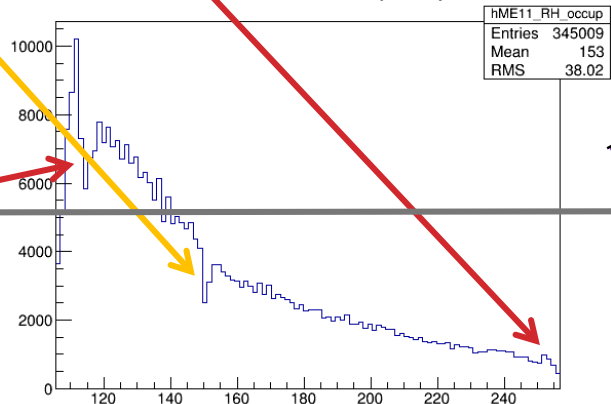


ME1/1 SPECIFIC GEOMETRY

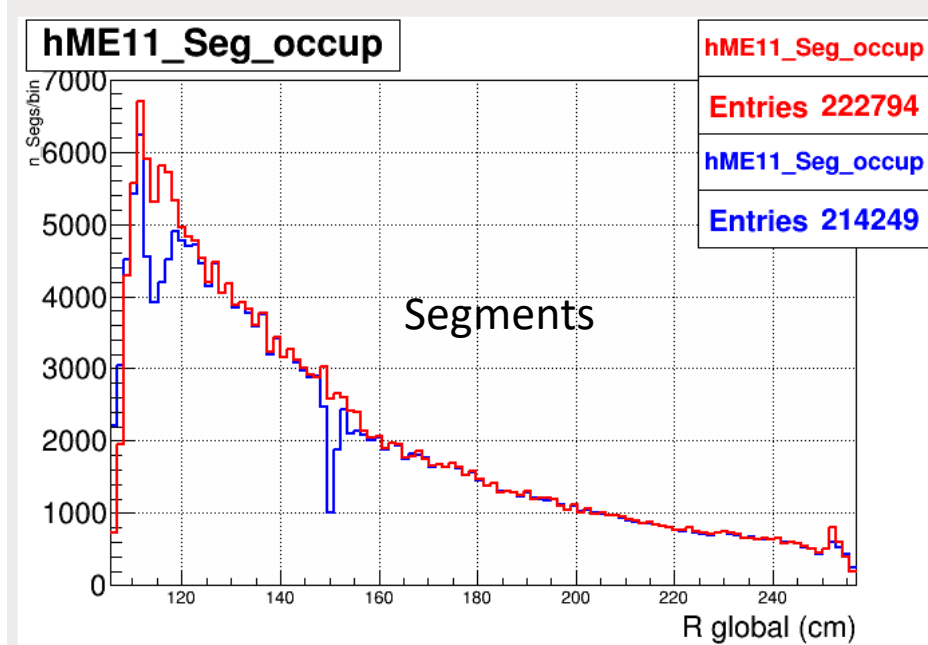
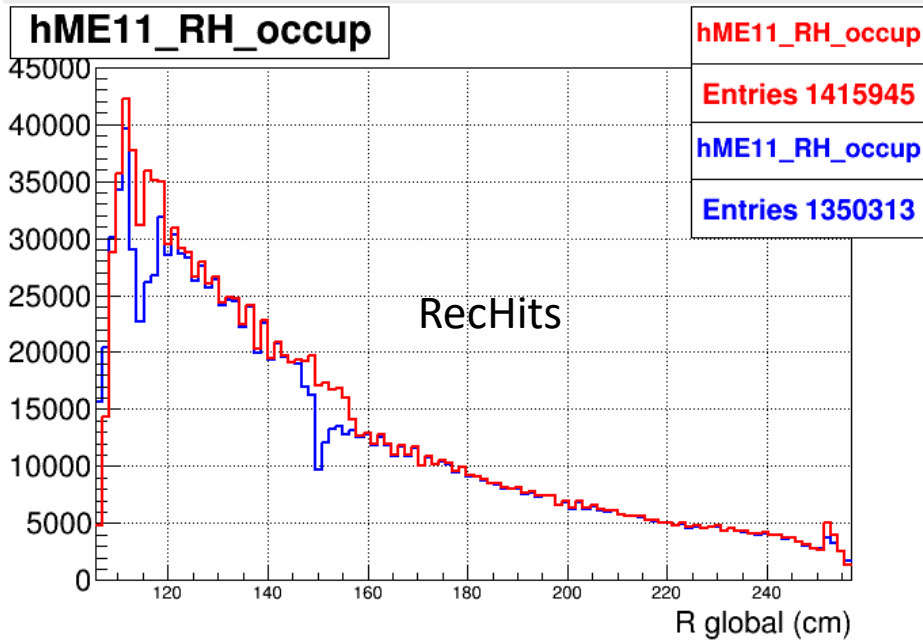
Full JINR responsibility



ME1/1 chamber hit occupancy



OVERALL ENHANCEMENT



The distributions became more regular.

BLUE – standard reconstruction approach

RED – new approach

Remark: All mentioned improvements are implemented into the official CMS software and will be used by default starting with LHC Run3 data taking.