Simulating GEM multiplication using Garfield++

<u>Matei Climescu</u>, Claudia Caterina Delogu, <u>Nina Höflich</u>, Joëlle Savelberg, Hendrick Smitmanns, Weiping Wang



GEM gain

- Gain as a function of the applied GEM voltage
- Mixture 90% Ar, 10% CO₂
- Total gain: includes all secondary electrons
- Effective gain: includes only the detected electrons
- The gain is expected to increase exponentially with voltage



GEM gain for different mixtures of Ar and CO₂



 Increasing the amount of CO₂ drastically reduces the gain, especially at higher voltages

Electron creation locations

Electrons are produced primarily at the generation positions and around the GEM holes



Development of a single-electron avalanche

- The evolution of a single electron's trajectory in 90/10 Ar/CO₂ was examined
- Electron remains alone in the drift region and multiplies in the gap
- Activity is intense in the gap, decreases afterwards

Electron Trajectories, Ar:CO, 90:10, HV 300 V



Group 2 hard at work



Backup: XY positions

