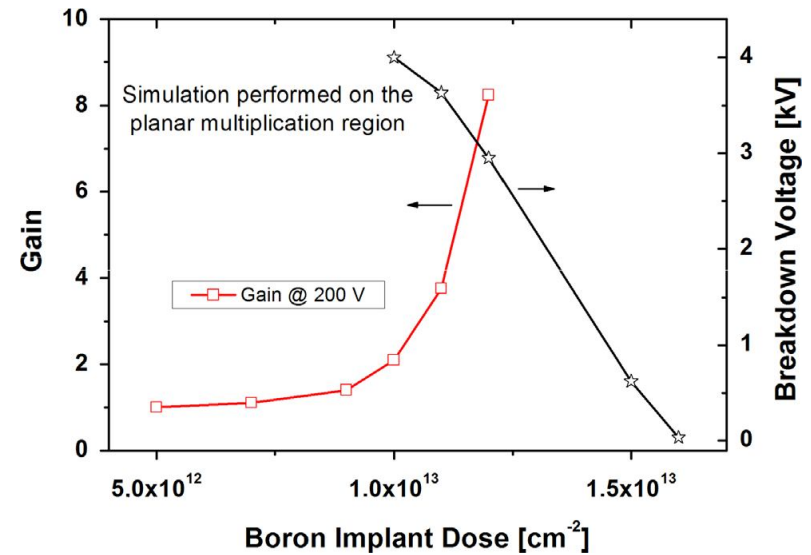
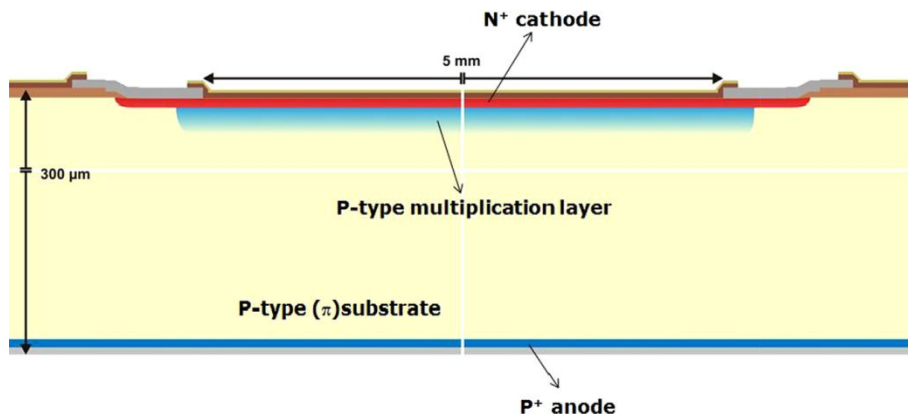


Simulation results and discussion

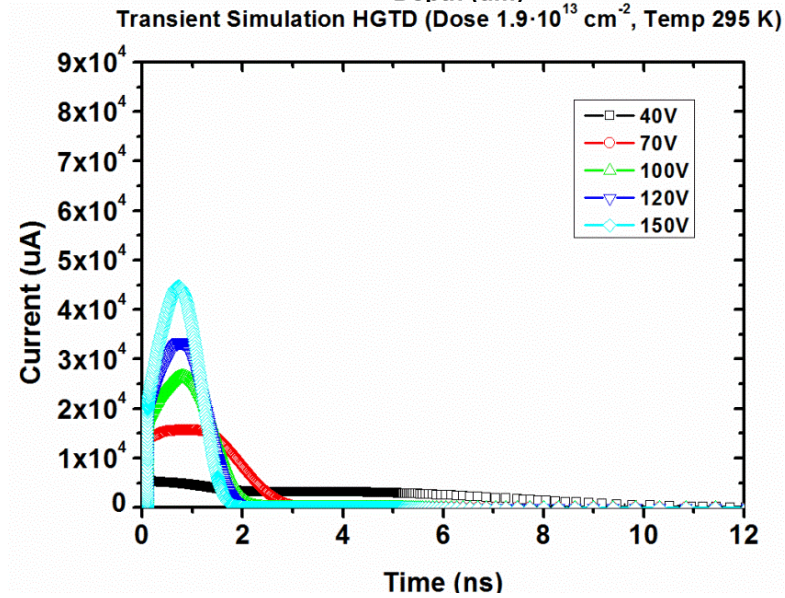
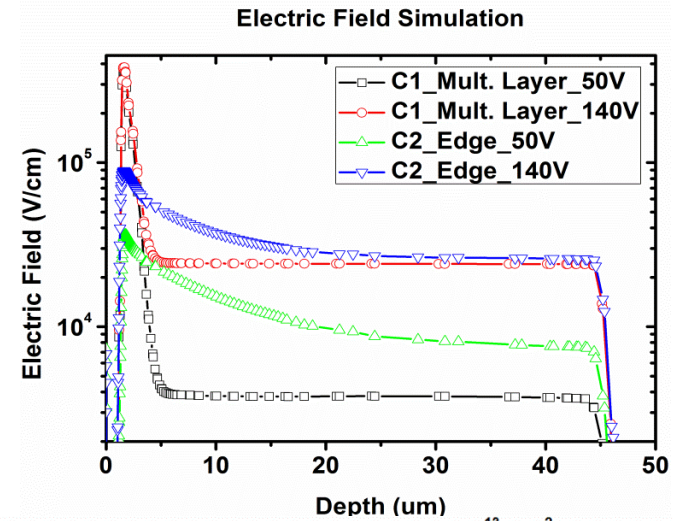
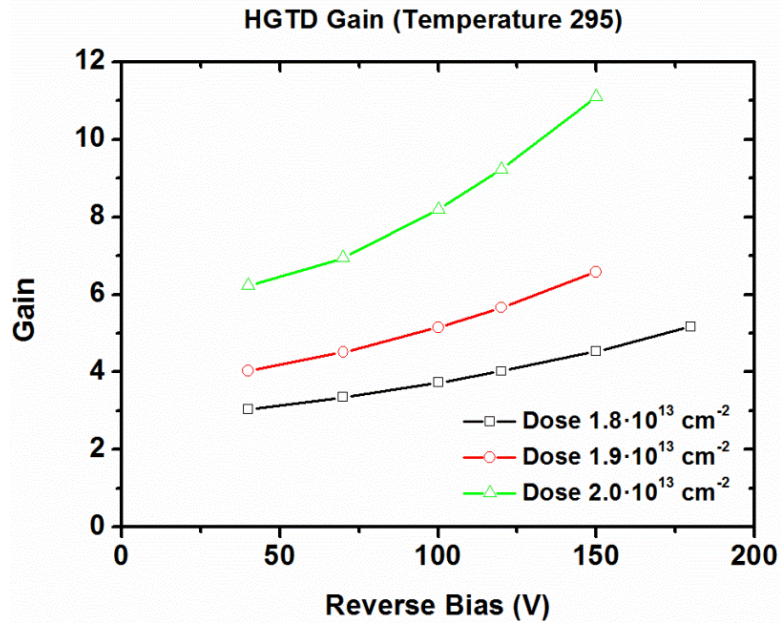
Mei Zhao

2018.11.08



- Increase dose: Gain increases, Breakdown voltage decrease.

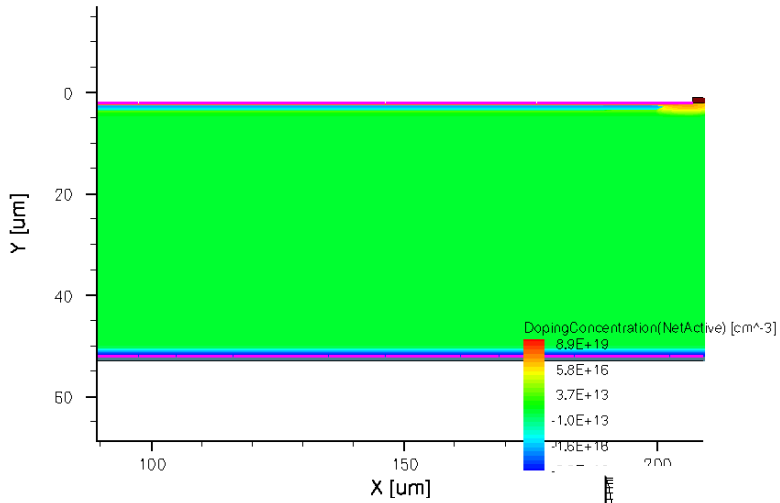
Technology developments and first measurements of Low Gain Avalanche Detectors(LGAD)for high energy physics applications,2014



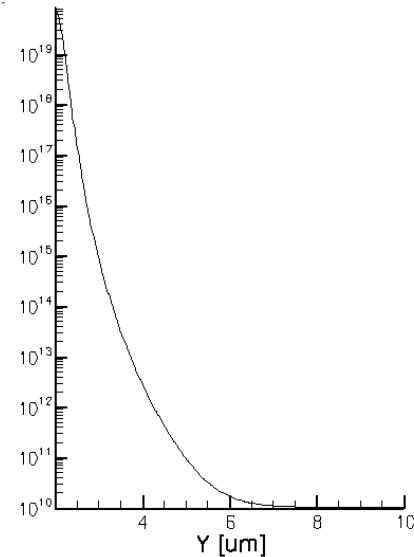
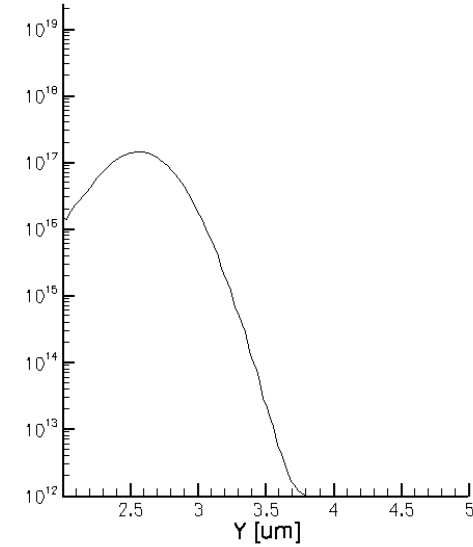
- For high V_{br} , need JTE and field plate
- For high Gain, dose must higher than $1.8 \times 10^{13} \text{ cm}^{-2}$.

Model

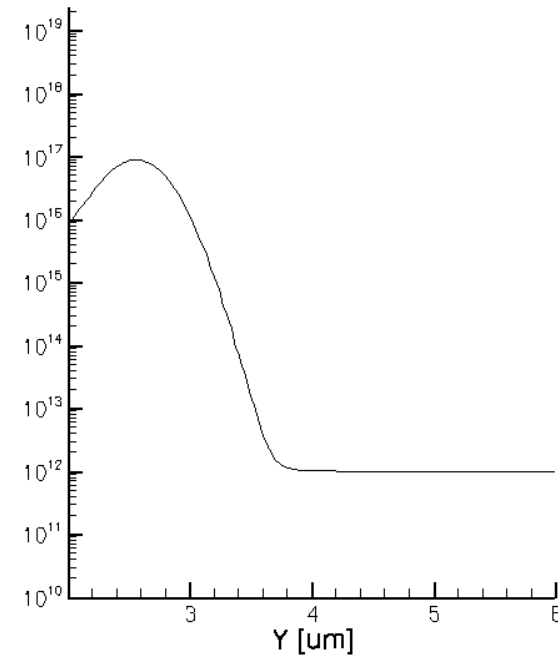
- Model based on process



BActive [001; simulation/spad/LGAD_0.8e13_fps.tdr 0-0] X=130



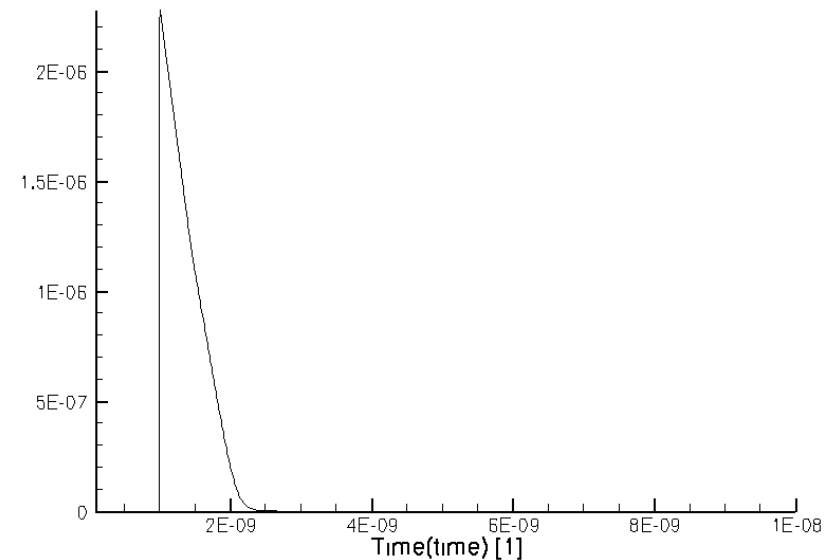
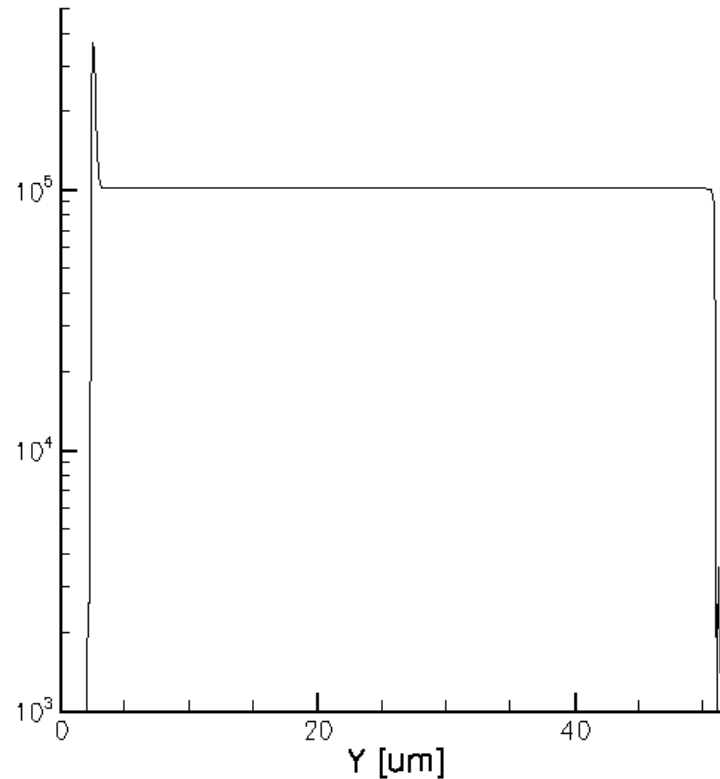
N⁺



P layer

Results

- For $0.5e-13$

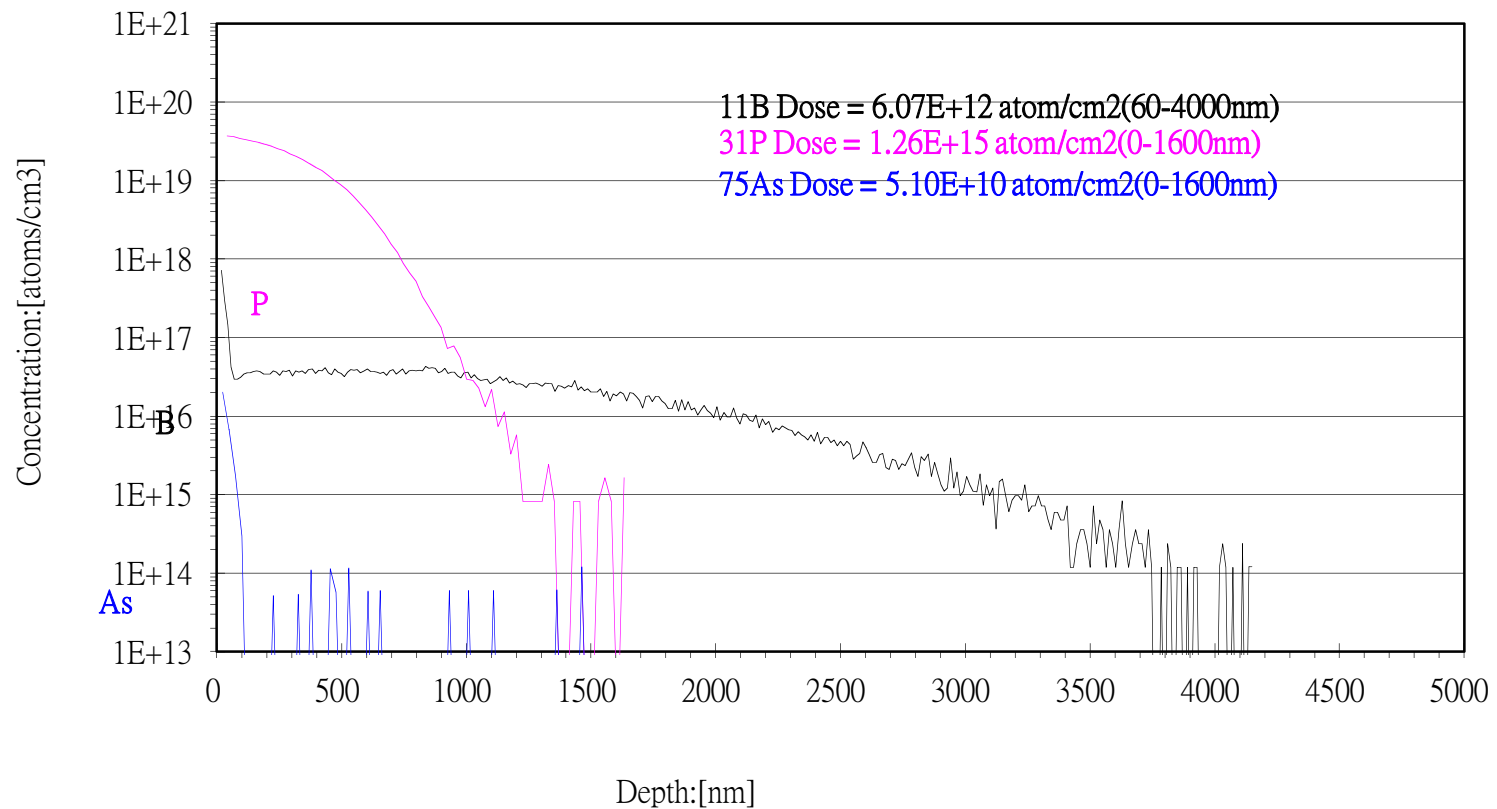


In our simulation, the V_{br} is 500V for $0.5e13cm^{-2}$, 50V for $0.8e13cm^{-2}$, 20V for $1e13cm^{-2}$.

Gain is about 2 for $0.5e13cm^{-2}$. Other condition the V_{br} is not satisfactory. Change JTE width can't change this situation.

- Why do they break down so quickly?

The accurate control of the doping profile in the multiplication area is the most important technological condition for the fabrication of LGAD.



- Change doping condition of p layer
- Get a high gain

- Add field plate..