4H-SiC 探测器的器件性能模拟

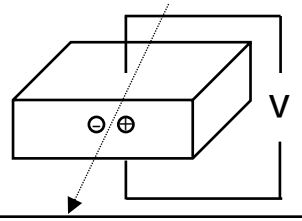
探测器对粒子信号响应的瞬态模拟

RASER

GEANT4

$$\nabla^2\varphi = -\frac{q}{\varepsilon}\left(N_d^+ - N_a^-\right)$$

$$i = Q(x)\boldsymbol{v}\cdot\boldsymbol{E}_W$$



- 器件全耗尽电场分布
- 粒子电离路径
- 粒子电离e-h 对分布
- 粒子注入信号电流
- 器件时间分辨

器件电流-电压，电容电压的静态模拟

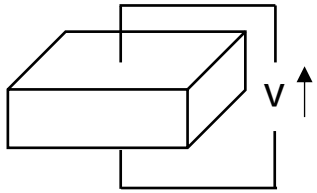
SICAR

DEVSIM

$$\nabla^2\varphi = -\frac{q}{\varepsilon}\left(p - n + N_d^+ - N_a^-\right)$$

$$\begin{cases}\frac{\partial p}{\partial t} = -\frac{1}{q}\nabla \bullet J_{\mathrm{p}} - R \\ \frac{\partial n}{\partial t} = \frac{1}{q}\nabla \bullet J_{\mathrm{n}} - R\end{cases}$$

$$\begin{cases}J_n = q\mu_n nE + qD_n\nabla n \\ J_p = q\mu_p pE - qD_p\nabla p\end{cases}$$



- 器件外加偏压下电场分布
- 电流-电压，电容-电压特性曲线
- …

Next:

- 4H-SiC迁移率和复合产生模型参数调研和设置
- SICAR仿真4H-SIC PIN器件I-V曲线，并与Sentaurus TCAD比较。