

基于外延层硅传感器的辐照损伤机理研究

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硅探测器的抗辐照研究是高能物理实验中的一个很重要的课题。基于外延层的硅传感器将是未来高能物理探测器的一个重要候选技术，然而其辐照损伤机理并未像高阻硅衬底传感器那样已被深入研究。本研究将对基于外延层的肖特基管进行各项测试，提取出 IV、CV 特性曲线以及电荷收集效率等参数在辐照前与不同剂量辐照后的变化，以建立基于外延层硅传感器的辐照损伤模型，适用中子辐照通量最高可至 $10^{16} \text{ n}_{eq}/\text{cm}^2$ 。本报告将对此研究的阶段性结果进行介绍。

The study of radiation resistance of silicon sensor is an important subject in high energy physics experiments. Silicon sensor with epitaxial layer will be a candidate technology for particle detector for future experiments. However, the mechanism of its bulk radiation damage is not as well studied as the sensors with high resistivity silicon substrate. In this study, dedicated Schottky diodes fabricated on epitaxial wafers will be tested, and the important properties such as IV and CV characteristic curves and charge collection efficiencies before and after neutron irradiation will be extracted, so as to build the bulk radiation damage model suitable up to the $10^{16} \text{ n}_{eq}/\text{cm}^2$.

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