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单极性电荷灵敏技术在碲锌镉探测器中的应用

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摘要:碲锌镉探测器具有本征能量分辨率好、单位体积探测效率高、可在室温工作等优点,是核辐射探测领域的研究热点。本文介绍了碲锌镉晶体材料特性和探测器工作原理,回顾了单极性电荷灵敏技术在碲锌镉探测器中的应用发展过程,基于 Shockley-Ramo 定理阐释了单极性电荷灵敏技术的原理,介绍了碲锌镉探测器中典型的单极性电极结构,总结了各种电极结构的最新进展和性能指标。

关键词:碲锌镉;权重电势;单极性电荷灵敏;电极结构

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Single Polarity Charge Sensing Technique in CdZnTe Detectors

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Abstract: The CdZnTe detectors have the advantages of good intrinsic energy resolution, high detection efficiency and room temperature operation, therefore have attracted much interest in the field of radiation detection. This article introduces the properties of CdZnTe crystal materials and the working principle of the detectors, reviews the application and development of single polarity charge sensing technique in the CdZnTe detectors. Based on the Shockley-Ramo theorem, the principle of single polarity charge sensing technique is explained. The typical unipolar electrode structures in the CdZnTe detectors are introduced and the latest progress and performance of each electrode structures are summarized.

key words: CdZnTe; weighting potential; single polarity charge sensing; electrode structure

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