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一种基于邻域的小像元红外焦平面阵列串音测试方法

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Crosstalk Model Based on Neighboring Elements for Small Element IRFPA

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摘要 串音是评价红外焦平面阵列(InfraRed Focal Plane Array, IRFPA)性能的重要参数之一，随着IRFPA技术的发展，探测器单元尺寸逐渐减小，传统小光点测试方法的光斑尺寸已接近甚至大于探测器单元尺寸，需要采用新的测试理论和方法。论文分析了红外光斑照射到IRFPA上的典型分布情况，研究了小像元情况下探测器单元的信号电荷及其相互关系，建立了基于八邻域的小像元IRFPA串音测试的理论模型，并将四邻域串音模型和传统串音模型作为八邻域串音模型的特例，给出了相应的测试方法。数值模拟表明：在小像元情况下光斑尺寸对串音系数的测量具有明显的影响；采用基于邻域的小尺寸像元IRFPA串音测试方法，可在现有测试设备上通过测试软件的修改，实现小像元IRFPA串音的测试。

关键词： 红外焦平面阵列 串音 邻域 衍射光斑

Abstract： Crosstalk is one of the important parameters for InfraRed Focal Plane Array (IRFPA) performance evaluation. As the size of IRFPA element reduces, the size of testing spot of traditional small spot test method is close to or even greater than that of IRFPA element, wherein new theory and method for crosstalk measurement is required. First, typical situations are analyzed when infrared spot illuminates onto IRFPA. Then the electrical signals of adjacent IRFPA elements are studied, and new crosstalk model for small element IRFPA is proposed based on 8 neighboring elements. 4 neighboring elements and traditional situation are two special cases of crosstalk model based on 8 neighboring elements. Mathematical analysis shows: the size of testing spot affects crosstalk apparently in small element IRFPA; crosstalk model based on neighboring elements can realize small element IRFPA crosstalk measurement using existing equipment, given that the software is modified.

Keywords： InfraRed Focal Plane Array (IRFPA) Crosstalk Neighboring elements Diffraction spot

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