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技术及应用

亚微米特征工艺尺寸静态随机存储器单粒子效应实验研究

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摘要 利用中国原子能科学研究院重离子加速器，开展了不同特征尺寸（0.35～0.13 μm）CMOS工艺、不同集成度（1M、4M、8M、16M）静态随机存储器(SRAM)单粒子翻转（SEU）和单粒子闩锁(SEL)实验研究，给出了SRAM器件的SEU、SEL截面曲线。与μm级特征尺寸的器件相比，随特征尺寸的减小，单粒子翻转更加严重。测量到了令人关注的单粒子多位翻转(MBU)效应，对翻转位数进行了统计分析。MBU对目前卫星系统采用的EDAC技术提出了挑战。

关键词 静态随机存储器 多位翻转 重离子加速器

分类号

扩展功能

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Experimental Research of SEU and SEL in High Density SRAMs With Sub-micron Feature Sizes

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Abstract The aggressive downscaling of CMOS technology has resulted in that radiation induced single event upset (SEU) reliability is getting worse and worse. Using the HI-13 tandem accelerator in China Institute of Atomic Energy, heavy ion SEU and single event latch-up (SEL) sensitivities for a variety of non-hardened high density static random access memories (SRAMs) with sub-micron feature sizes were reported. The results were compared with previously measured sensitivities for similar devices with larger features. The problems associated with SEU become more sever as device dimensions decrease. Multiple-bit upsets (MBU) for the HM62V16100LT15 in 0.13 μm CMOS technology caused by a single ion were analyzed. The frequency and the distribution of MBU were given. MBU makes challenge for EDAC adopted by the system of satellites.

Key words static random access memory multiple-bit upset heavy ion accelerator

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