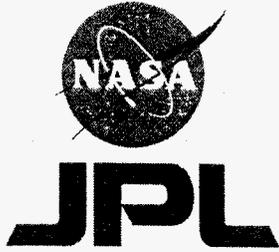


Floating Gate Dosimetry based on Differential Charge Injection

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Clemson, SC 29634-1911

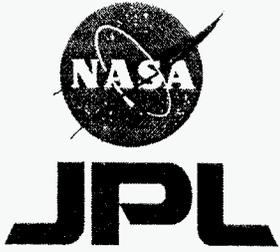
² Now at the Jet Propulsion Laboratory, Pasadena, Ca, 91108¹⁹



INTRODUCTION



-
- **Device seen to erase predictably with dose**
 - **Each Floating gate electrically accessible**
 - **Dosimeter response sensitive to LET**

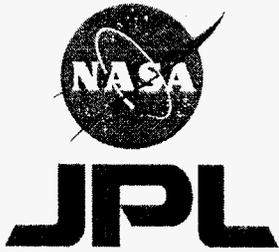


Requirement of UV-less dosimeter

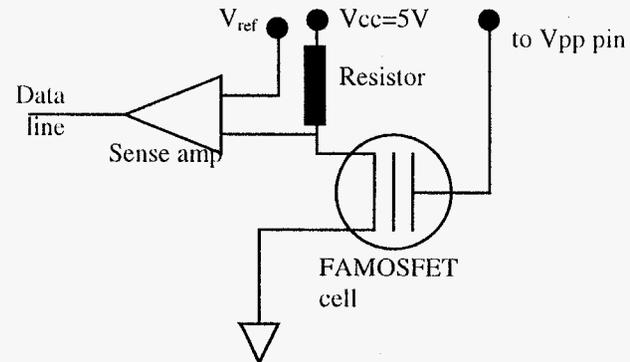
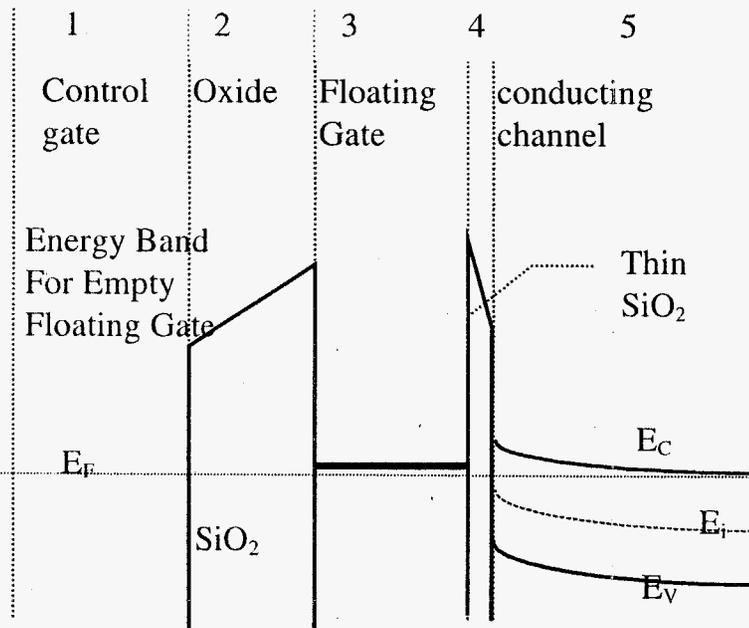


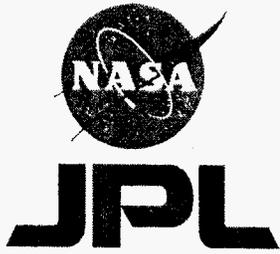
- **Dosimeter must**

- ◆ Low tolerance of false positives
 - Due to flicker-like noise
 - 1 per 100 readings
- ◆ Good resolution
- ◆ Thermally insensitive/compensated

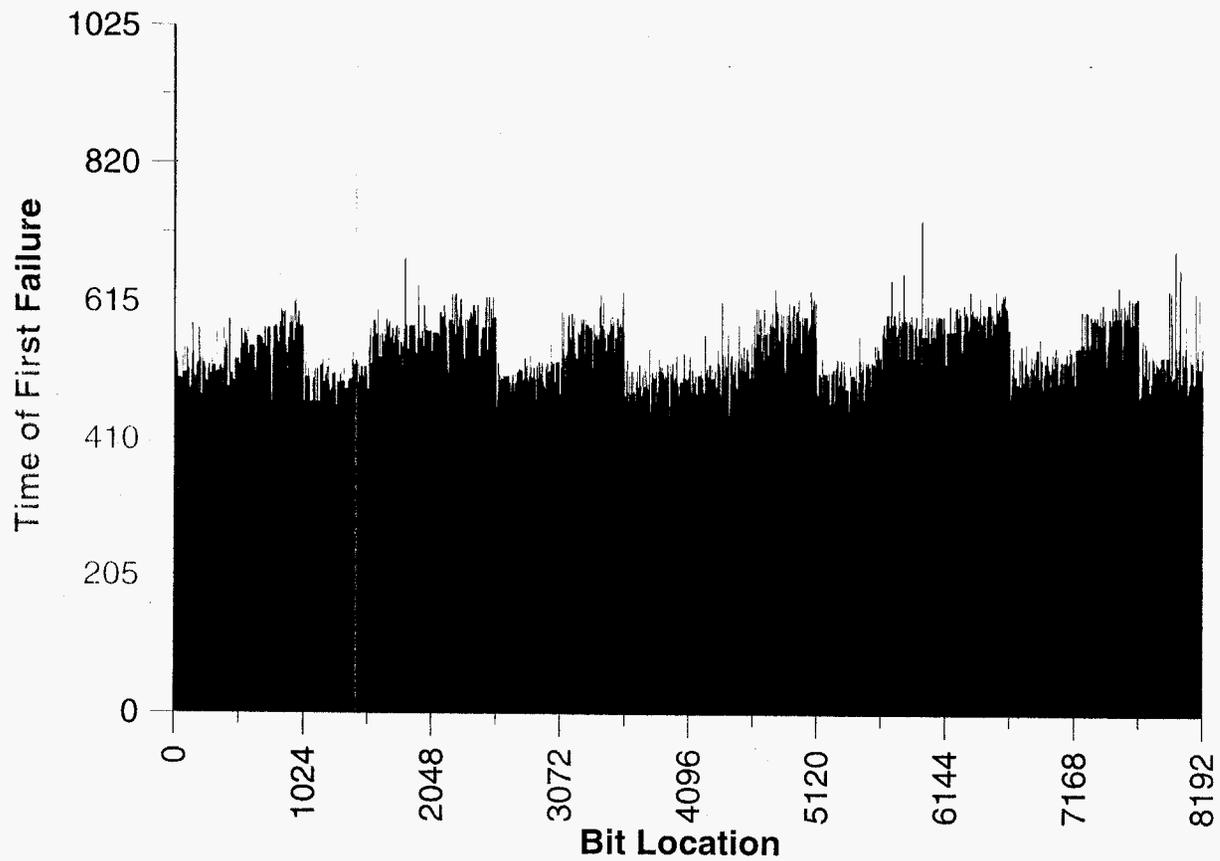


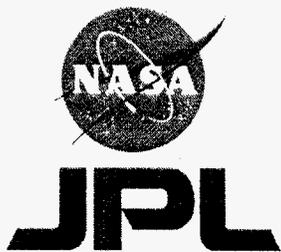
FAMOS FET



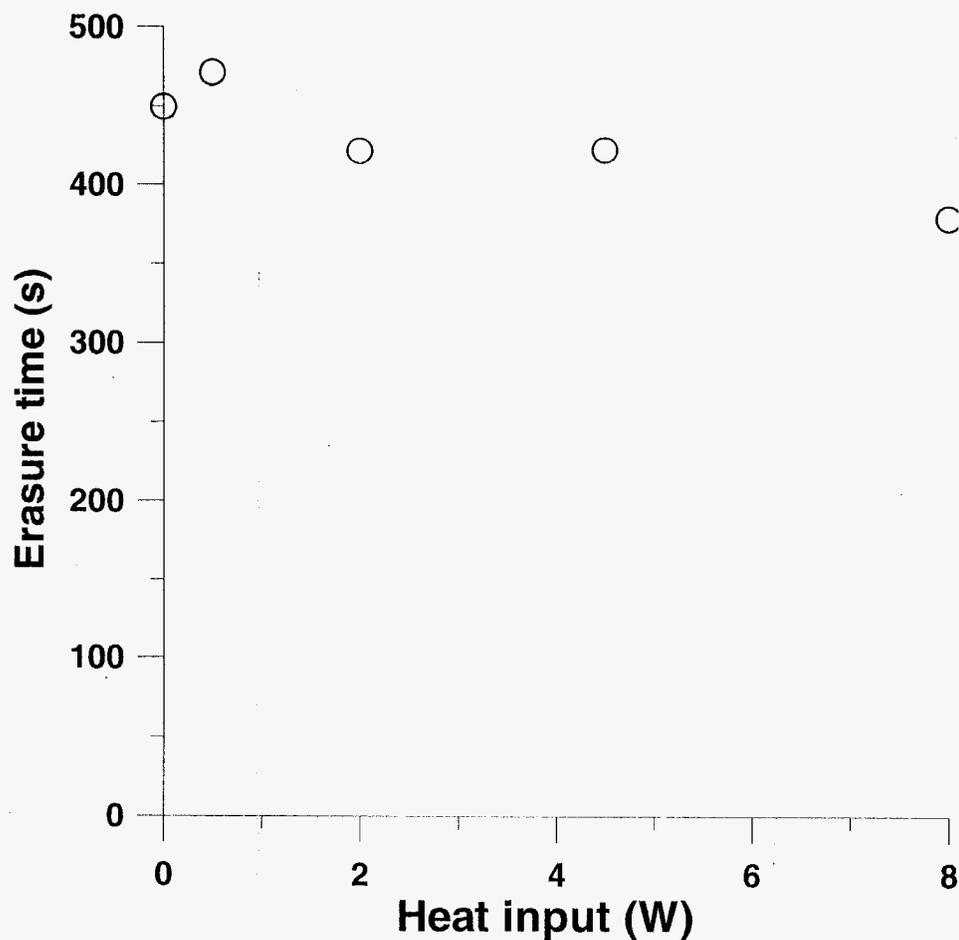


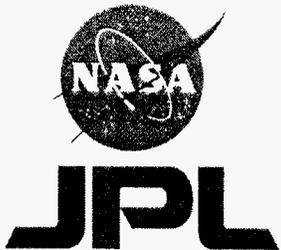
1 GeV Argon Ions



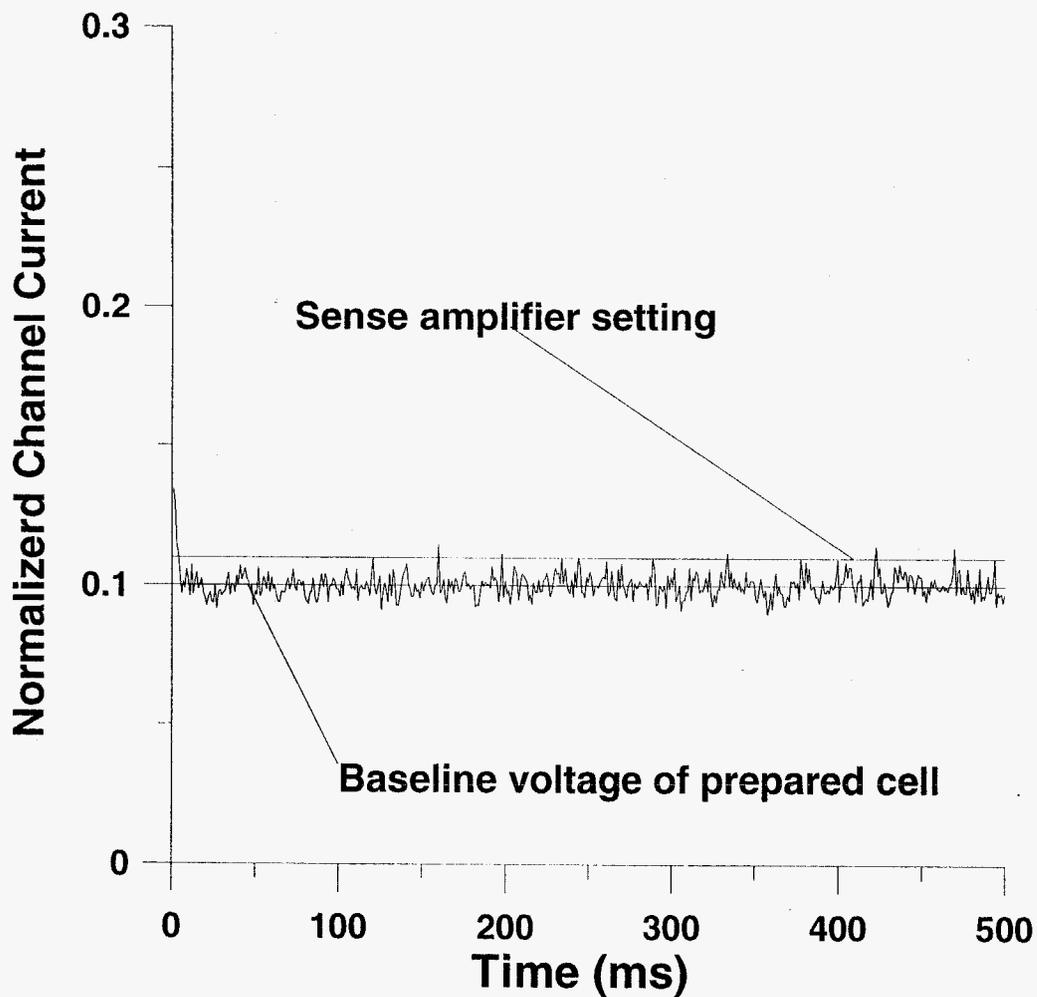


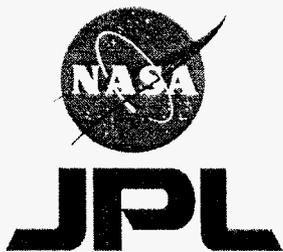
50 MeV Protons Live-Remote Equivalence



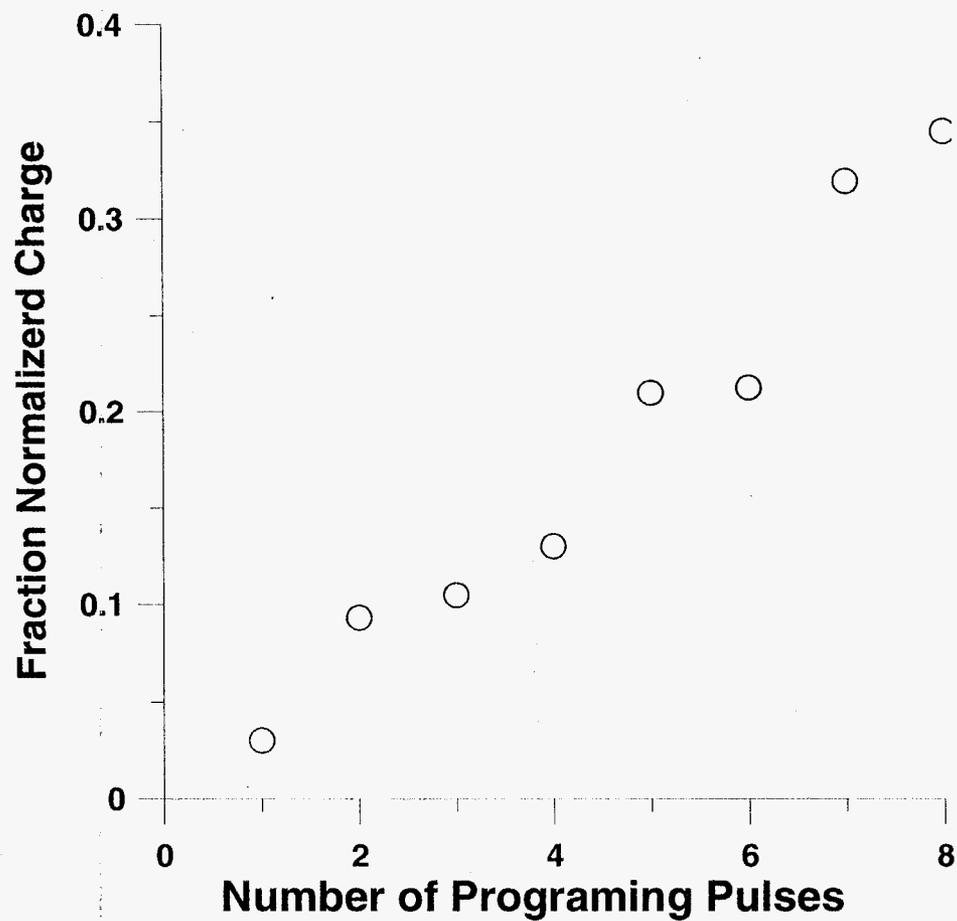


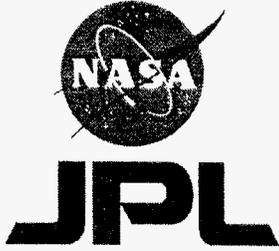
LET Dependence of Sensitive Volume





Varying Response to LET

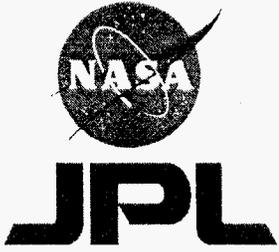




LET Dependence



- **Obvious correlation between response and radiation type which was not predicted**
- **Two possible theories:**
 - ◆ FAMOS n-channel thus diminishing effect from radiation due to LET dependent interface effects
 - ◆ FAMOS cell erasure could be sensitive to variable LET
- **Provides two applications for device**
 - ◆ Dose measurement with correction for LET
 - ◆ LET differential and small volume analysis



Summary and Conclusions



- **Effective charge collection volume can be measured for FAMOS cell**
 - ◆ Assumptions can be refined
- **Exponential dependencies on LET**
 - ◆ Intimated recombination effects
- **Can be exported to other target problems**
 - ◆ TID as well as SEE issues