A Neat Methodology for Microprocessor Upset Testing

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Outline

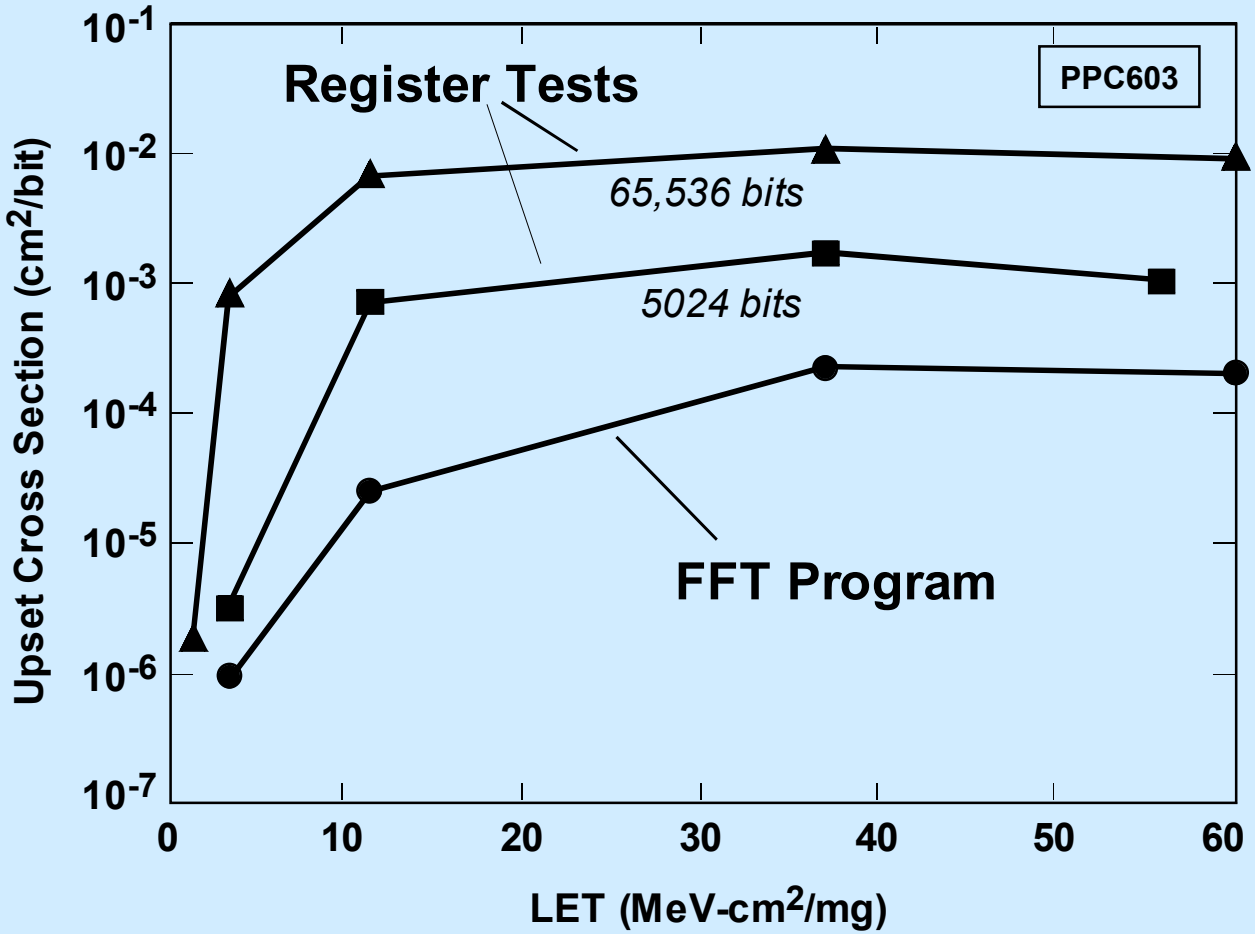
I. Register Tests vs. Application Tests

II. “Pin Wiggler” methodology

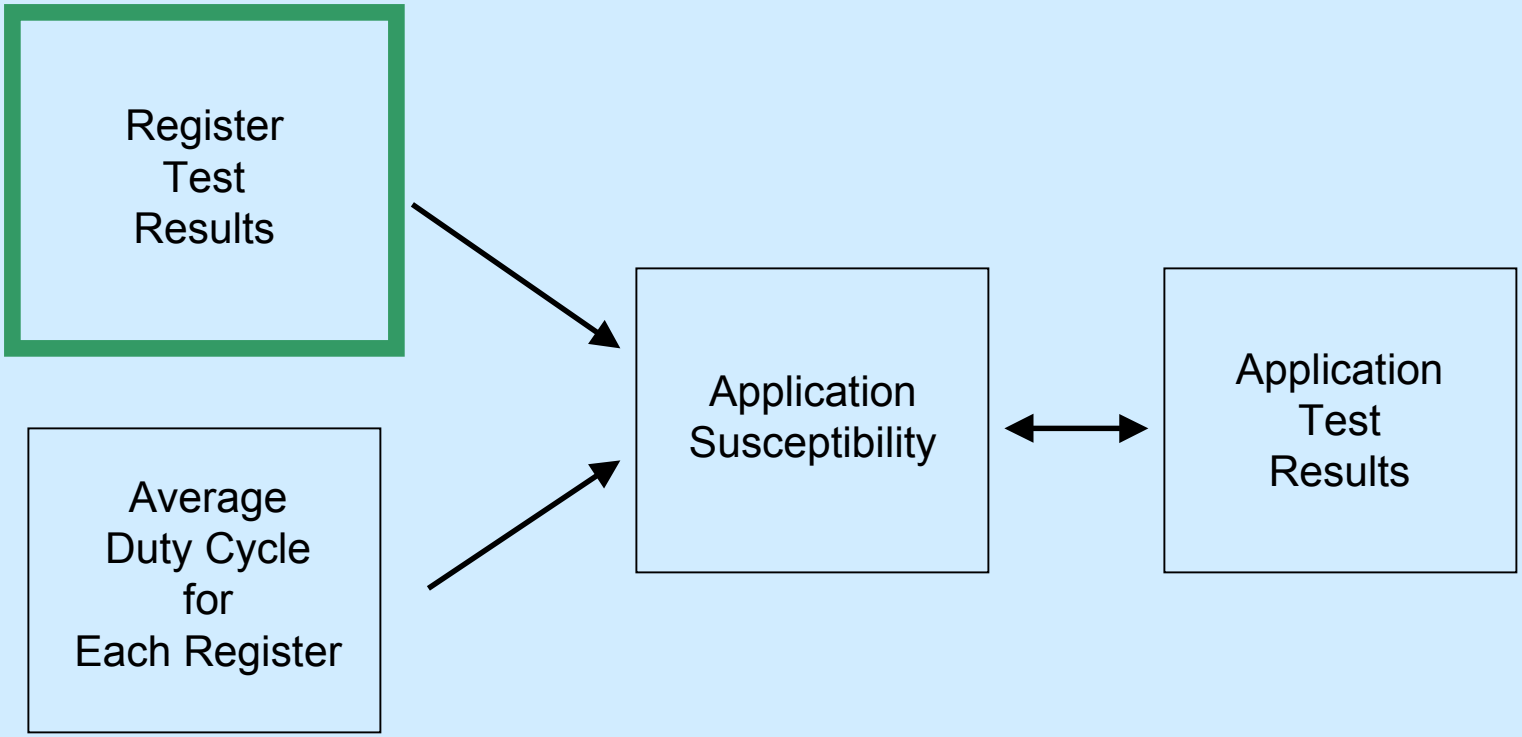
III. Example results: 2 microcontrollers

IV. Conclusion

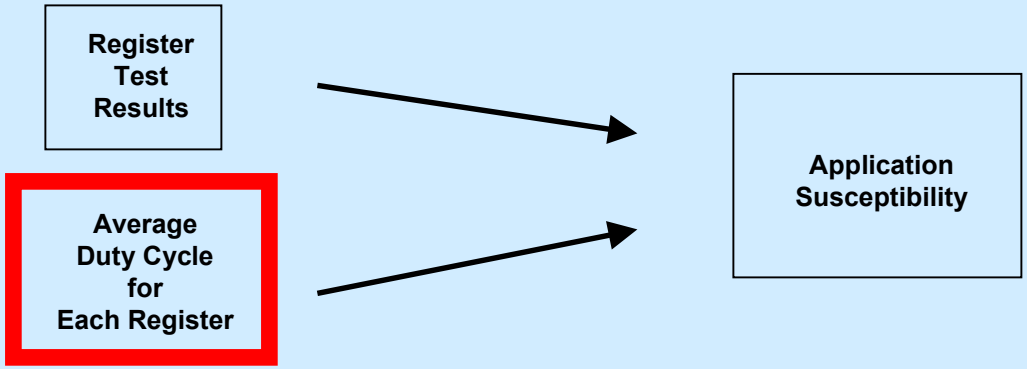
Register Testing versus Application Testing

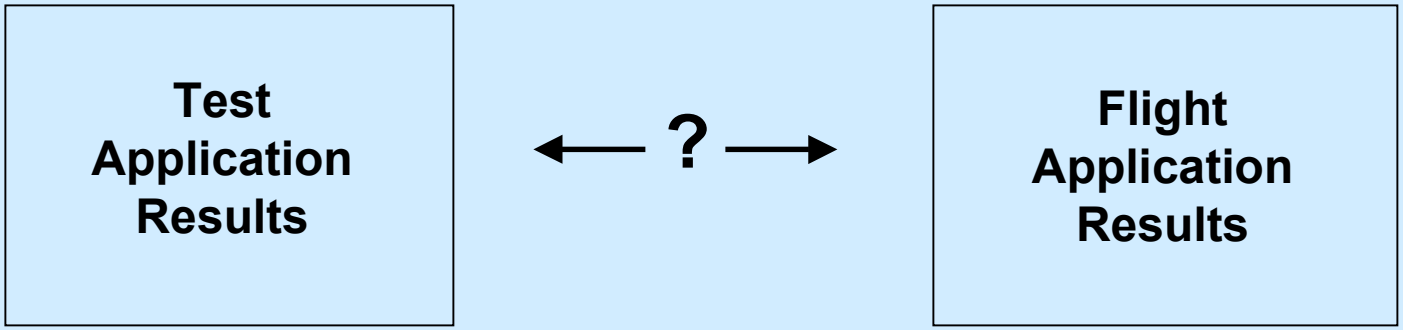


Register Testing Yields “Fundamental” Information

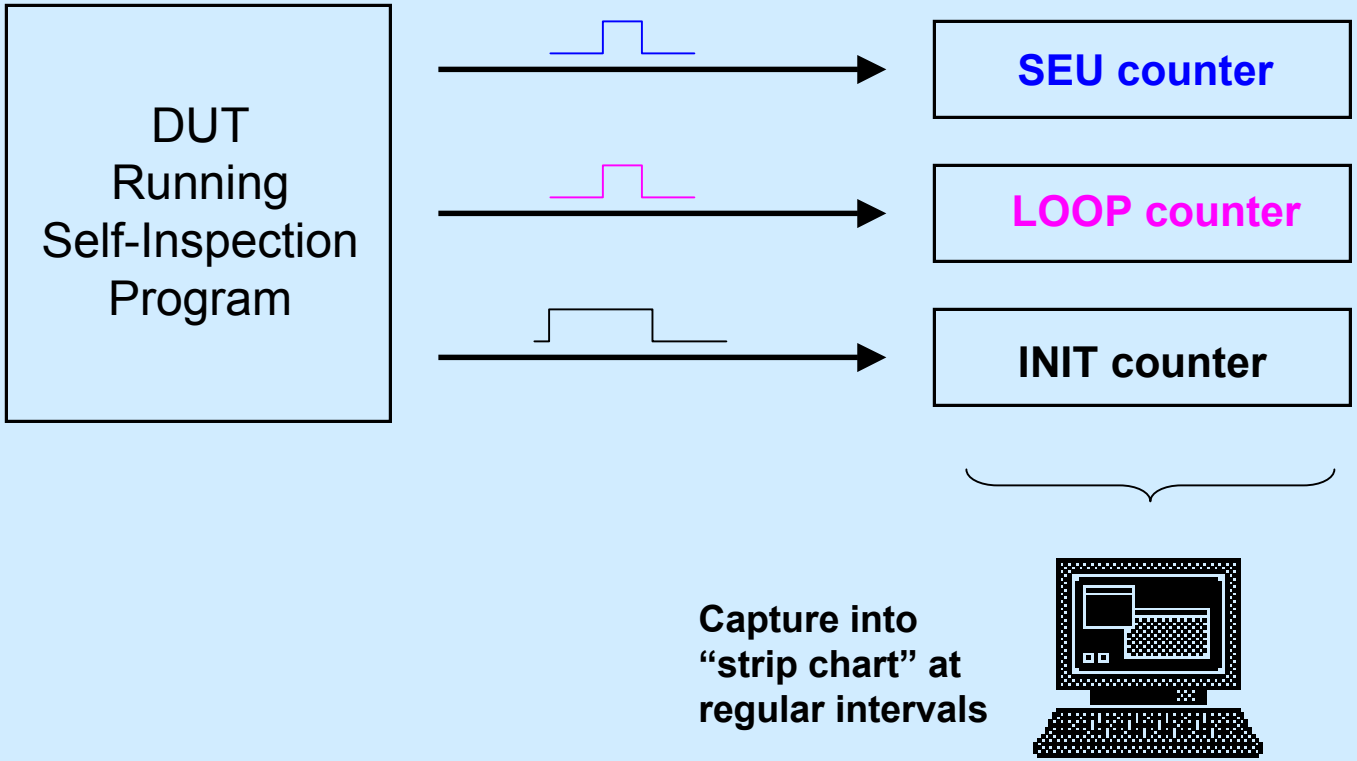


Calculation Of Space Upset Rates





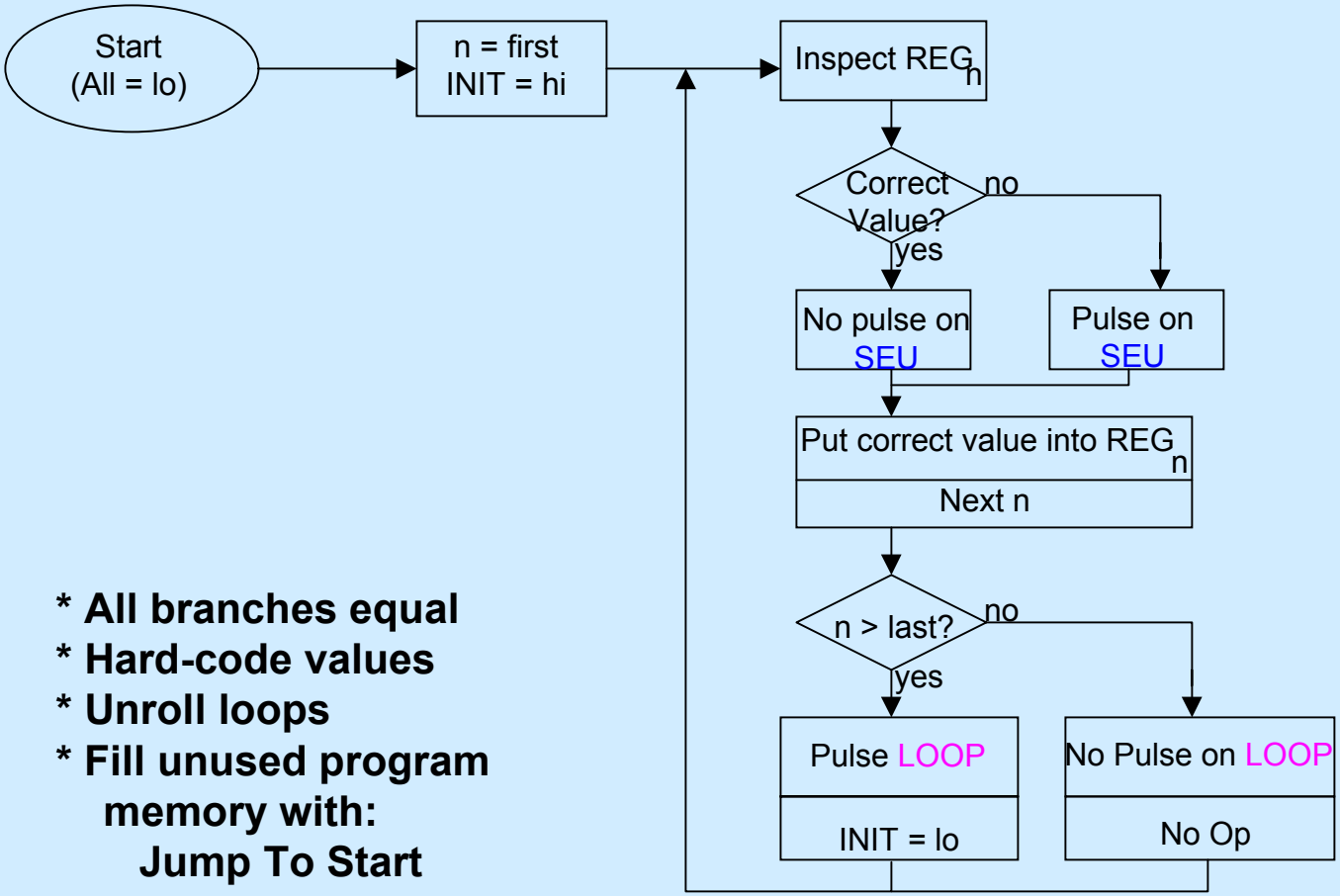
“Pin Wiggler” Method For Register Testing



CAUTION
TEST IN PROGR
DO NOT DIST

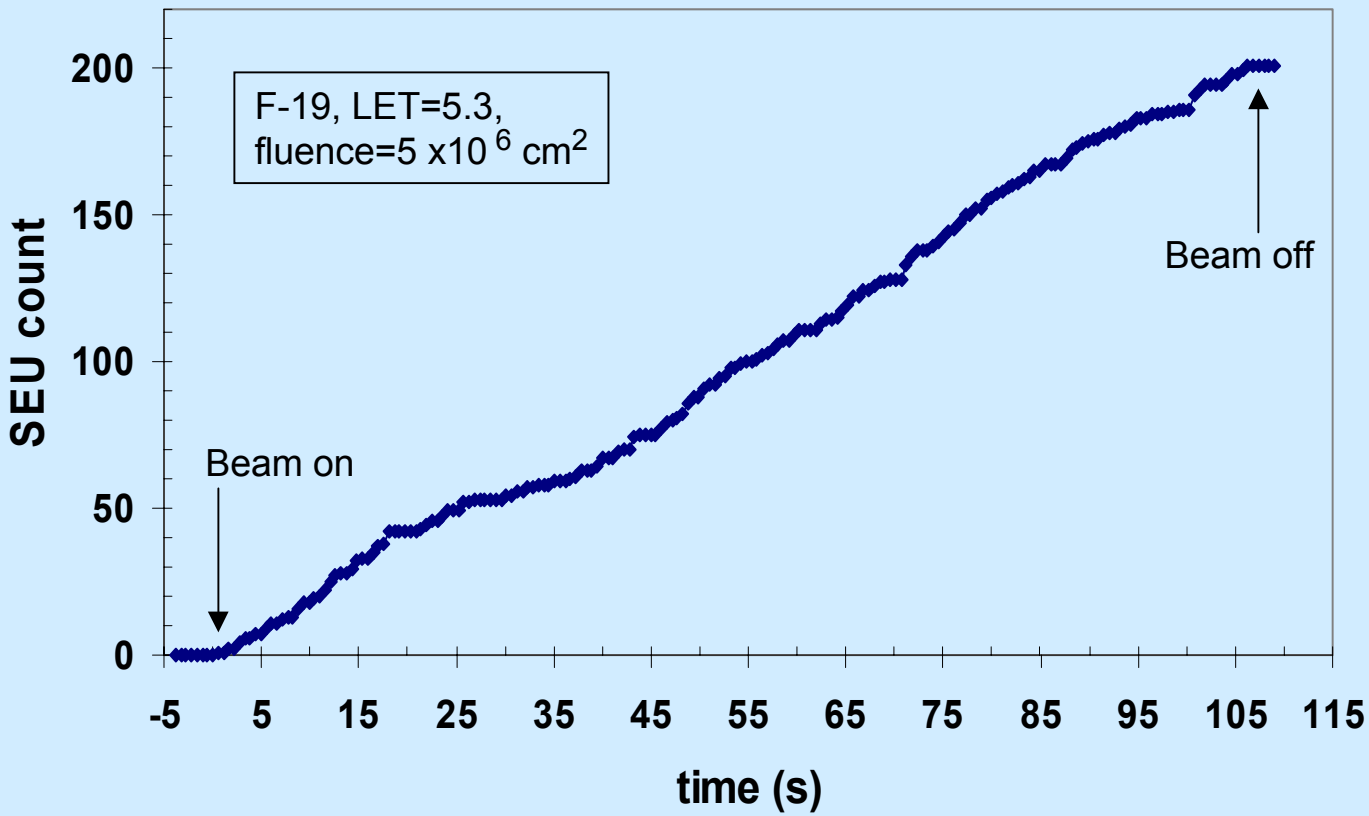
CAUTION
TEST IN PROGRESS
DO NOT DIST

“Pin Wiggler” Self-Inspection Program

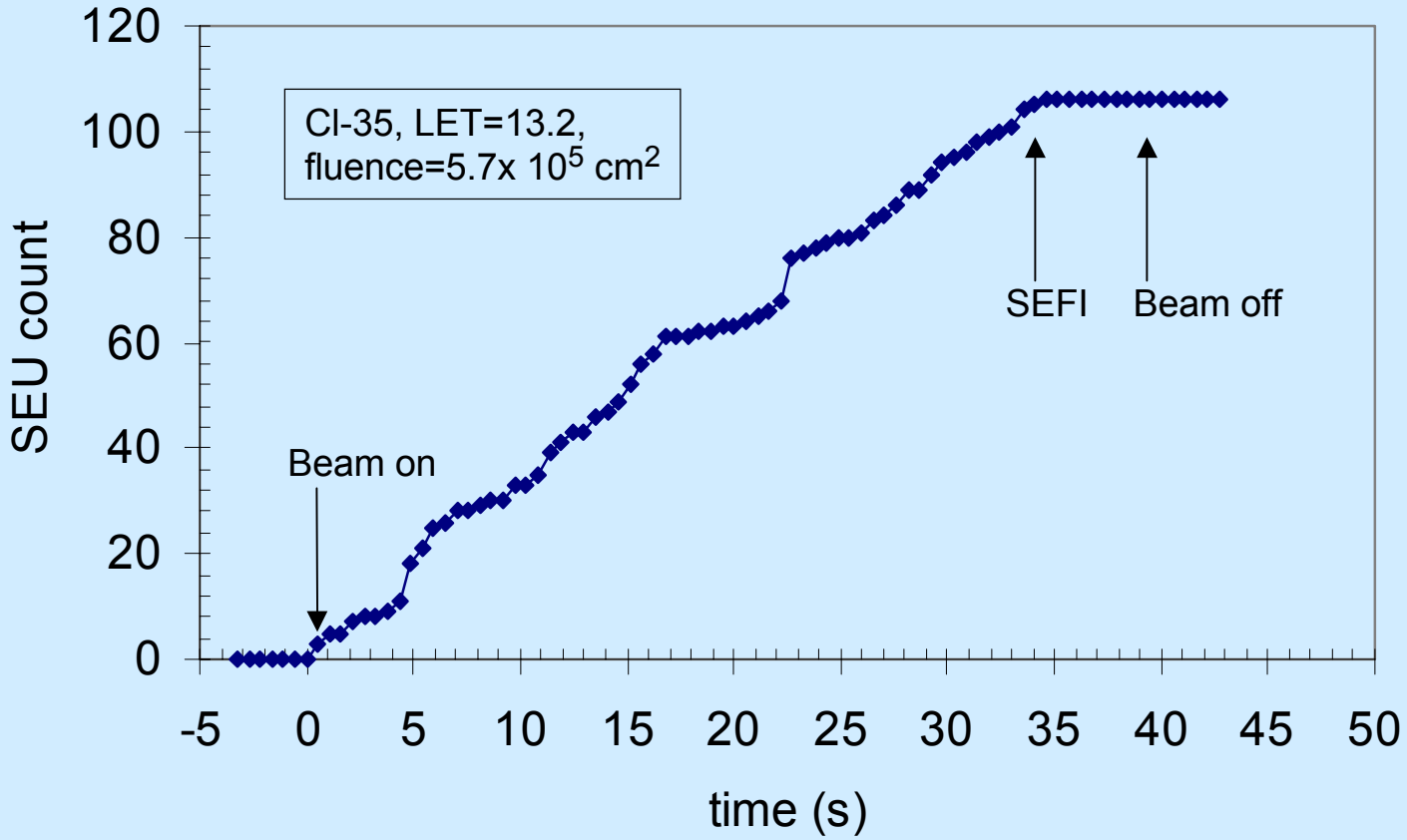


* All branches equal
* Hard-code values
* Unroll loops
* Fill unused program memory with:
  Jump To Start

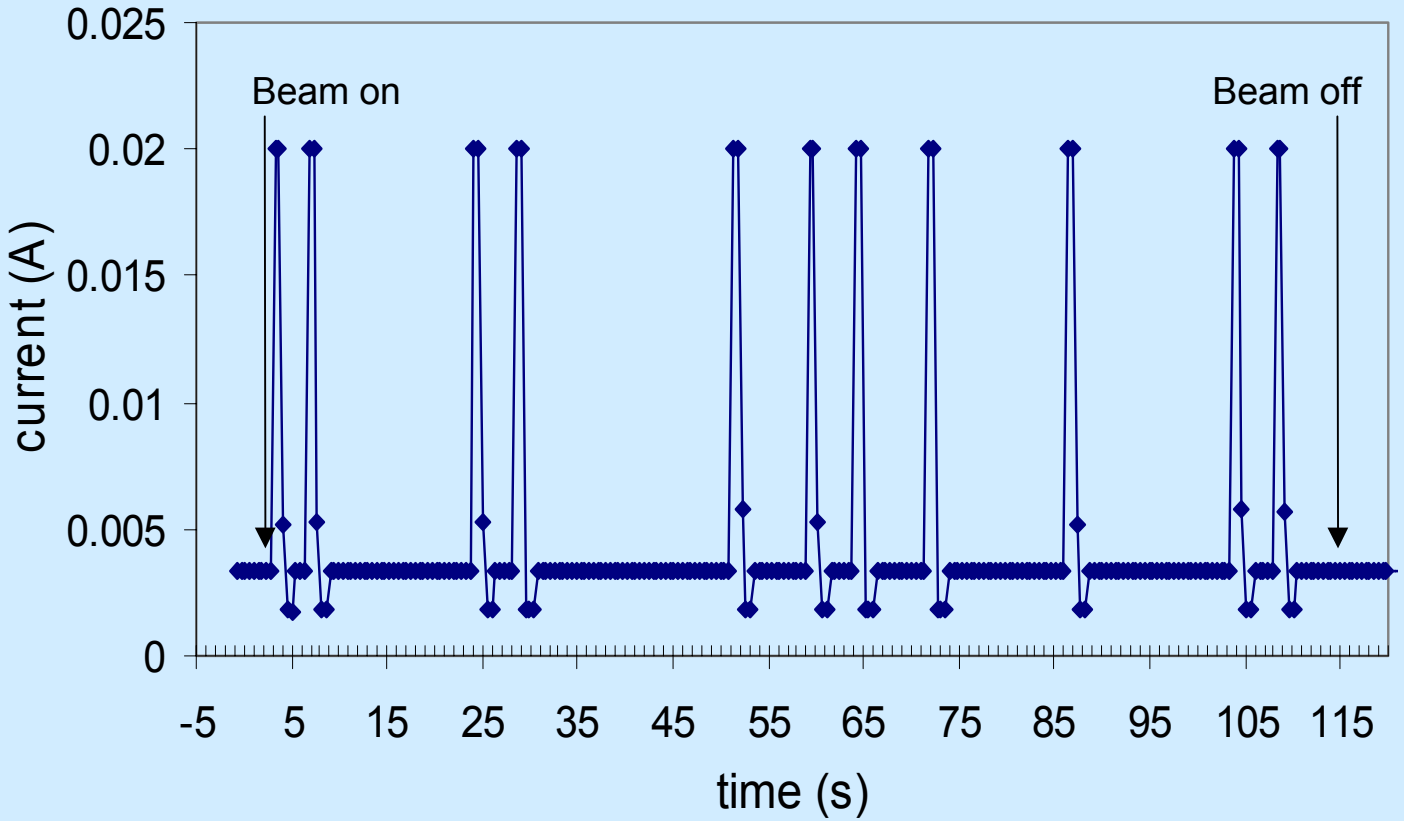
Example: PIC 16C505 upsets



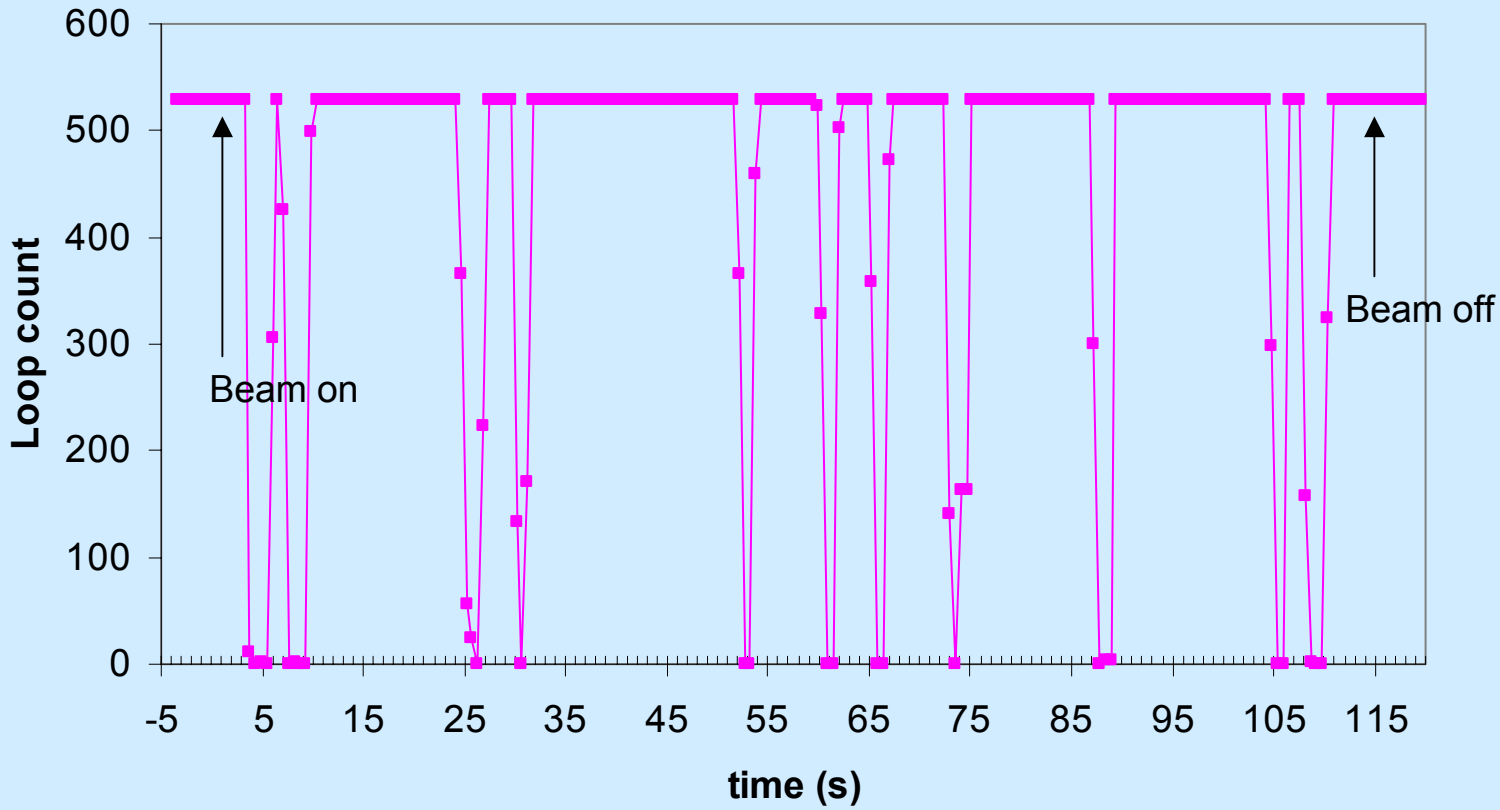
Example: PIC 16C505 (w/ SEFI)



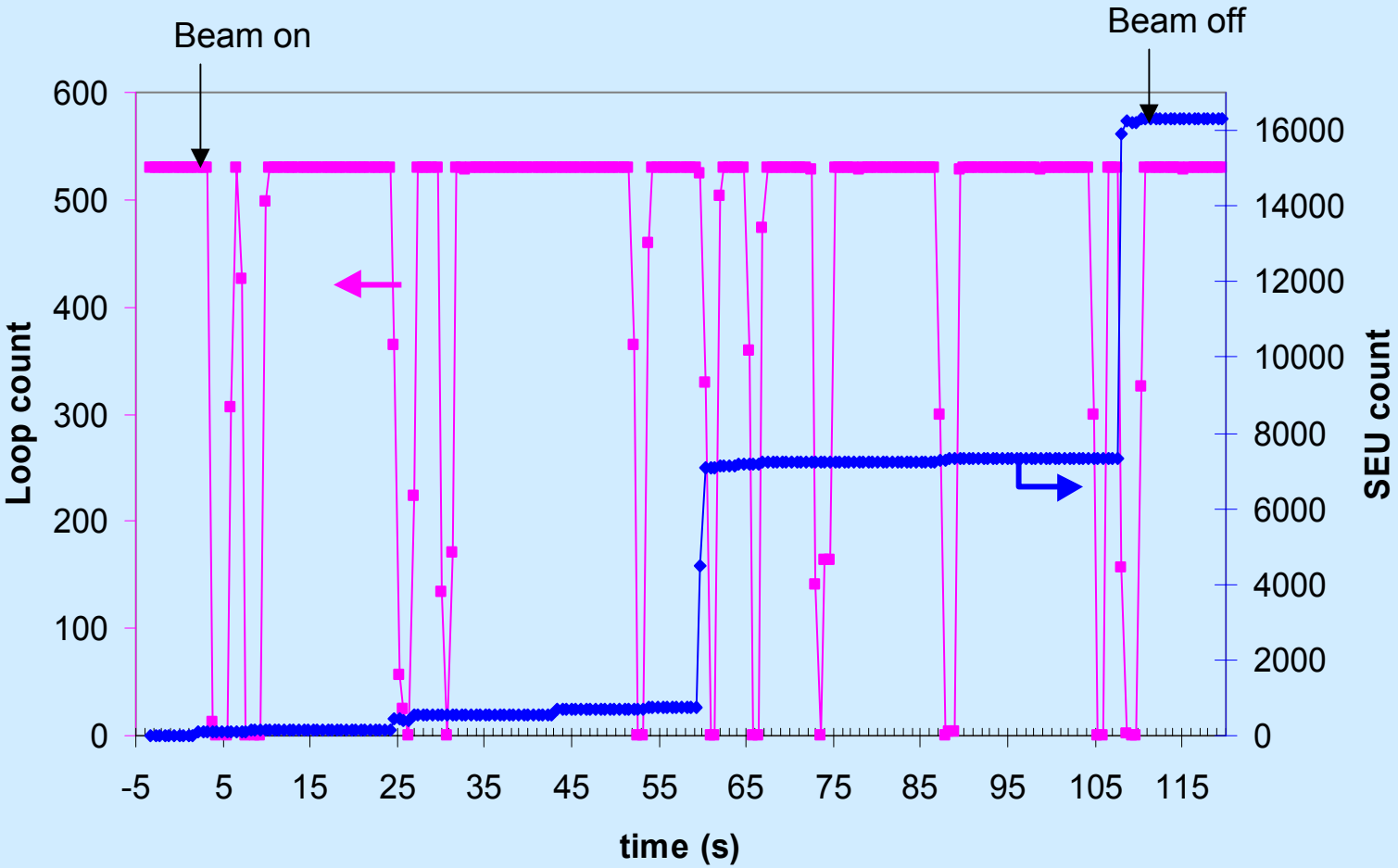
Example: AIC51 - 11 latchups



Example: AIC51 - Loop counter



Example: AIC51 - Upset results



Conclusion

"Pin Wiggler" is:

- simple
- data rich

but has limitations of all register testing