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EXPERIMENTAL HEAVY-ION SEU CROSS-SECTIONS OF SRAM MEMORY COMPONENTS

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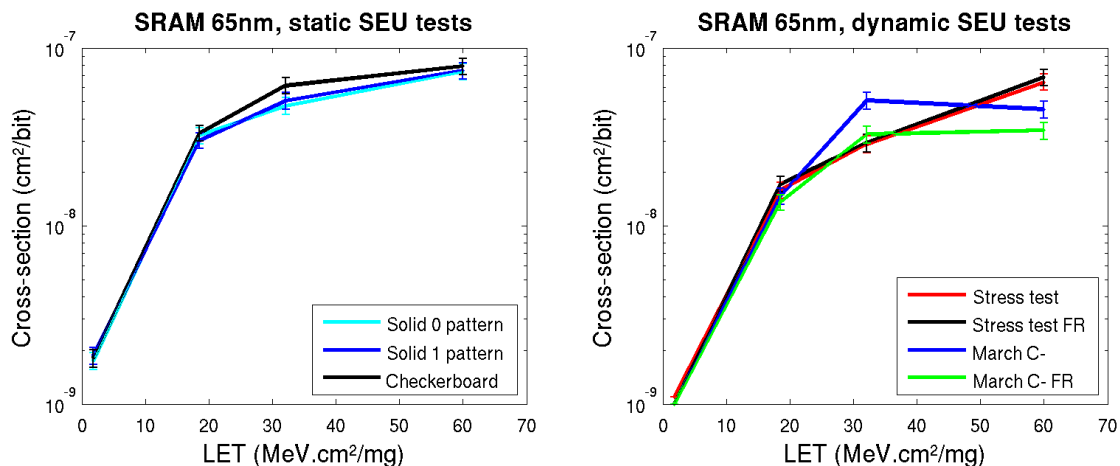
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In this work the heavy ion induced Single Event Upset (SEU) cross-sections and resulting failure rates of SRAM memory components were studied.

A series of experiments were carried out at the Radiation Effects Facility (RADEF) [1] in the Accelerator laboratory of the University of Jyväskylä. Experiments consisted in irradiating the memory arrays in vacuum with a variety of heavy ions. The effect of Linear Energy Transfer (LET) of incoming ion and component operating mode (static/active) [2] on the component failure mode (SEU/MBU/SEFI) and rate was investigated. Results from the dynamic tests for 65nm SRAM are presented in the following figures. Based on the obtained results, on-orbit failure rates can be extrapolated by using models for radiative environment and equivalent spacecraft shielding.



Selected components are candidates for integration on board the future Montpellier 2 University (France) CubeSat MTCube. During this mission, data on the actual radiation response of the devices will be collected. The purpose of this present work is to provide radiation sensitivity data to help selecting the most interesting and relevant candidate devices for the mission.

[1] RADEF webpage: <https://www.jyu.fi/fysiikka/en/research/accelerator/radef>

[2] G. Tsiligiannis *et al.*, "Evaluation of test algorithms stress effects on SRAMs under neutron radiation", Proc. IEEE IOLTS, 2012.