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Ensuring the reliability of power electronic devices with regard to terrestrial cosmic radiation

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Terrestrial cosmic radiation (CR) is a significant factor for the reliability of power electronic devices, for all voltage classes from 150V to 6500V, for all device types and irrespective of the base material. Exact failure rate data are required to balance CR hardness and electrical performance for an optimum system design. Accelerated irradiation testing methods depend on the availability of high-energy/high-flux particle beams to model the terrestrial CR radiation environment and a quick & easy access for industrial users.

This talk will briefly explain basic CR-induced failure mechanisms. Options and limits of predictive device simulations will be discussed. Accelerated CR testing methods, most of which have already been laid down in a JEDEC specification (JEP151), will be described, with an emphasis on requirements for beam quality, infrastructure and access for industrial testing.

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