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ABSTRACTS**

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A Metal Oxide Semiconductor ionizing radiation detector architecture with increased voltage sensitivity

**Russell Duane¹, Nikola Vasovic², Mary White¹, Alan Blake¹,
Anne Marie McGarrigle¹, Srboljub Stankovic³, Aleksandar Jaksic⁴**

¹ Tyndall National Institute, University College Cork, Cork, Ireland

² Varadis, Cork, Ireland

³ Vinca Institute of Nuclear Sciences, Belgrade, Serbia

⁴ Sievert Association, Cork, Ireland

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A Metal Oxide Semiconductor (MOS) ionizing radiation detector architecture which senses trapped charge in the dielectric due to incident ionizing radiation is presented. The detector architecture increases output voltage signal as a function of trapped charge in the sensing dielectric in comparison with state of the art MOSFET (RADFET) technology.

Numerical simulations were employed to help develop the device concept. It is shown that an improved voltage sensitivity is possible due to a reduction in the sensing capacitance which, unlike RADFET technology, is decoupled from the dielectric capacitance.

An initial prototype of the detector has been fabricated in the silicon fabrication facility of Tyndall National Institute and irradiation experiments have been performed which confirm the improved voltage sensitivity versus commercial RADFET detectors. It is envisaged that further sensitivity increases may be possible by integrating dielectrics other than silicon dioxide.

