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Advanced cancer treatment with radiation and space exploration: synergy of fundamental particle physics and medical physics research

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Many discoveries in particle physics obtained on high luminosity colliders will be impossible without development of sophisticated semiconductor radiation detectors and Application Specific Integrated Circuits (ASICs) for their multichannel readout electronics. Among them different kind of strip detectors, pixelated detectors, detectors utilising 3D detector technology, Low Gain Avalanche Detectors (LGAD) and many others. Many years of their radiation damage studies by high energy physics community led to material engineering realised in extremely radiation hard silicon, diamond, silicon carbide and other semiconductor detectors.

Radiation detection science driven by fundamental particle physics was paramount for advanced medical imaging of cancer and its treatment using ionizing radiation. The talk will demonstrate the link between fundamental research in particle physics and advancement in medical radiation physics including overview of 30 years of R&D in radiation detection at Centre for Medical Radiation Physics (CMRP) that realised in family of sophisticated radiation detection systems important for error free radiation therapy and success of space missions and lead to their commercialisation for benefit of cancer patients.

Supporting fundamental physics research is investment in our healthy future.

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