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Airport passenger security screening: automated detection of concealed threat items with kinetic inductance detector arrays in a passive sub-mm wave scanner.

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Real-time video rate imaging and automatic recognition of threats and contraband items that were concealed beneath layers of clothing on moving passengers was recently demonstrated with a prototype passive sub-mm imaging system at Cardiff Airport in the UK. The passengers did not have to divest their outer clothing layers and the instrument was able to distinguish between threat and non-threat items with excellent accuracy in less than the amount of time it takes to pass across the field of view. This level of performance for a passive imaging system is only achievable with low temperature detector systems and, although the financial cost of such systems may be high relative to currently available technology, this is easily offset by the associated benefits; such as increased passenger throughput, reduction of required real estate, avoidance of electromagnetic radiation exposure and, of course, an overall improvement in the passenger experience. Our prototype security imaging system is based on arrays of Aluminium LEKIDs operating at 250mK in a cryogen free cooling platform with compact scanning optics, narrow band optical filters, fast signal processing electronics and a machine learning application for threat detection that was trained with many thousands of marked-up images. We look forward to presenting the latest results of our development.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

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