Contribution ID: **39** Type: **Contribution type**

XSpectra®: an Advanced Technology for Improving Real-Time Inspections on Food Production-Lines

Thursday, June 10, 2021 2:00 PM (20 minutes)

The very big need for an improvement in the efficacy of real-time foreign-bodies and non-conformities inspection on production lines in the food sector has pushed Xnext towards the development of a novel patented inspection technology, called XSpectra®. The technology architecture is modular, each acquisition module being equipped with a 128 CdTe pixels 1D array and covering a linear inspection area of 10 cm. The current signals generated by the pixels are read-out and pre-processed by proprietary full-custom Front-End ASICs, whose output signals are then digitized and processed by a full-custom Multi Channel Analyzer providing for radiation spectrum reconstruction. Spectral data of all the acquisition modules is thus conveyed over a proper network interface towards a back-end processor running advanced Neural Network algorithms performing both spectral image reconstruction and foreign bodies detection. Experimental results have shown the XSpectra® capability to operate with a sensitivity down to about 9 keV of energy at photon-rates up to several millions of photons per second. A line-width of about 5.5 keV FWHM has been measured, at room temperature, on the 59.54 keV line of an Am241 very-low activity isotopic source. The system spectral non-linearity error has been measured to be within ±0.5% in the energy range 25 keV - 100 keV. Real-world industrial test-cases have demonstrated the effective superiority of XSpectra®, with respect to other conventional inspection technologies, in detecting low-density foreign bodies inside food products.

Primary authors: Mr GARAVELLI, Bruno (Xnext S.p.A.); MACERA, Daniele (Xnext S.p.A.); Dr SAMMARTINI, Martina (Xnext S.p.A.); Prof. BERTUCCIO, Giuseppe (Politecnico di Milano); Prof. GHIRINGHELLI, Giacomo (Politecnico di Milano); Prof. ZAPPETTINI, Andrea (IMEM-CNR)

Presenter: MACERA, Daniele (Xnext S.p.A.)

Session Classification: Session