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Developing all-in-one SiPM package arrays for Nuclear Instrumentation DONNIE HOSKINS, ZHENGYU XU, MIGUEL MADURGA FLORES, University of Tennessee — The rapid development of Silicon PhotoMultipliers (SiPM) has made them a very attractive solution to read out scintillator materials. Moreover, SiPM are by nature very resistant to extreme environments at low temperatures, low pressures, or high magnetic fields. Most commercial solutions simply integrate arrays of several small SiPM with common cathode and individual anodes readouts. They require external preamplifier solutions, with dedicated connections that will be prone to electronic pickup and noise. We have developed highly integrated SiPM package, including on-board preamplifiers, for a variety of nuclear instrumentation needs. Here we will present the first results of the board performance using EJ-200 plastic scintillators and LaBr(Ce) Brilliance. Using a compact 4x4, 24x24 mmˆ2 array with LaBr(Ce), we obtain a 4.5% energy resolution at 667 keV, remarkably similar to the larger 36x36 mmˆ2 array developed for the apollo array at HELIOS [1]. [1] J.C. Lighthall et al, Nucl. Intr. Methods A622, 97 (2010) ; https://www.phy.anl.gov/atlas/workshop14/APOLLO.pdf

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