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Recent progress with the RPWELL detector

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The RPWELL detector is a single-sided THGEM (copper clad on one side only) coupled to the readout electrode through a sheet of large bulk resistivity. Former laboratory and accelerator studies, performed in Ne/CH₄(5%), have demonstrated its large dynamic range (from single electrons to thousand times MIPS), high gains (> 106), and high detection efficiency over a broad particle-flux range. The RPWELL operation under these conditions was stable, with no observable discharges.

In this work we will present the results of recent studies of these robust single-stage RPWELL detectors. We will compare their performance with Ar-based gas mixtures to that with Ne/CH₄(5%) - making the RPWELL an attractive imaging detector for large-area applications in particle physics, astro-particle physics and homeland security. We will discuss the preliminary performance of RPWELL-based UV-photon detectors, with CsI-coated electrodes; among potential benefits for this application are the high sensitivity to single photoelectrons and large dynamic range (discharge-free operation under highly ionizing background).

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