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Progress on the Characterization of the Yale "PIXeY" Two-Phase Xenon Detector NICHOLAS DESTEFANO, MOSHE GAI, University of Connecticut, DANIEL MCKINSEY, ETHAN BERNARD, SIDNEY CAHN, ALESSANDRO CURIONI, BLAIR EDWARDS, CHRISTOPHER KACHULIS, NICOLE LARSEN, ALEXEY LYASHENKO, JAMES NIKKEL, YUNCHANG SKIN, CHRISTOPHER WAHL, ALEXANDER YOUNG, Yale University, UNIVERSITY OF CONNECTICUT COLLABORATION, YALE UNIVERSITY COLLABORATION — PIXeY (Particle Identification in Xenon at Yale) is a two-phase (liquid/gas) xenon prototype detector with 3-kg active mass. The two-phase xenon technology has many applications that include gamma-ray imaging, neutrinoless double beta decay searches, and dark matter searches. PIXeY was built to optimize energy resolution and gamma/neutron discrimination, with a number of technological improvements over previous work. Parallel-wire grids, which control the drift and proportional-scintillation fields, are optimized both for light collection efficiency and field uniformity. High quantum efficiency Hamamatsu R8778 PMTs, high-reflectivity Teflon walls, and charge-light anti-correlation techniques are also incorporated. PIXeY will serve as a platform for future improvements, including multiple optical volumes and single wire readout for R&D on gamma-ray imaging and track-imaging studies. The latest progress on the detector will be presented.

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