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Microhexcavity Plasma Panel Detectors

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Plasma panel detectors are a variant of micropattern detectors that are sensitive to ionizing radiation. They are motivated by the design and operation of plasma display panels. The detectors consist of arrays of electrically and optically isolated pixels defined by metallized cavities embedded in a dielectric substrate. These are hermetically sealed gaseous detectors that use exclusively non-hydrocarbon gas mixtures. The newest variant of these “closed-architecture” detectors is known as the Microhexcavity plasma panel detector ($\mu\text{H-PPS}$), consisting of 2 mm wide, regular close-packed hexagonal pixels each with a circular thin-film anode. The fabrication, staging, and operation of these detectors is described. Initial tests with the $\mu\text{H-PPS}$ detectors operated in Geiger mode yield Volt-level signals in the presence of ionizing radiation. The spontaneous discharge rate in the absence of a source is roughly 2-3 orders of magnitude lower compared to the rates measured using low energy betas.

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