

INSTRUMENTS AND EXPERIMENTAL TECHNIQUES

**ПРИБОРЫ И ТЕХНИКА ЭКСПЕРИМЕНТА
(PRIBORY I TEKHNIKA ÉKSPERIMENTA)**

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LARGE-FORMAT WEDGE-AND-STRIP COLLECTOR FOR COORDINATE-SENSITIVE PARTICLE DETECTOR

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The authors describe the design and fabrication method for a large-format wedge-and-strip collector for a coordinate-sensitive detector based on microchannel plates. The working surface has a diameter of 68 mm, the structure spacing is 1.6 mm, and the width of the gap that isolates the collector elements is 16 μm .

The problem of registration of ultraweak images formed by spatially distributed fluxes of particles (electrons, ions, and neutral particles) and photons, which is often encountered in physics research, is solved with the aid of coordinate-sensitive detectors (CSD). These detectors determine in real time the coordinates (in digital form) of impact of a registered particle (photon) on the sensitive surface of the detector and accumulate an image in computer memory. Among CSDs, those based on microchannel plates (MCP) have gained the widest use. First developed at the end of the 1960s, CSDs combine a high space resolution with excellent time characteristics [1-4]. One of the key elements of a CSD is its collector, which converts the coordinates of the center of gravity of the electron avalanche formed by the MCP unit to charge signals, from which the coordinates of particle impact on the sensitive surface are reconstructed. Among the various types of collectors used in CSDs, collectors of the wedge-and-strip type (WS collectors), which were proposed by Anger in 1960 [5, 6], are finding increasing use. The first use of such a collector in a CSD was described by Martin et al. [7]. At the present time, they are widely employed in various photon and particle detectors in laboratory and space research. Wedge-and-strip collectors were first created in our country in 1982 [8, 9]. Today, WS collectors are used not only in MCP-based CSDs but also in CSDs that are based on proportional counters [10] and Penning counters [11]. WS collectors differ greatly in their fabrication method, materials, collector-structure shape, and substrate type [7, 12, 13]. The effect of design characteristics have been examined in detail [14].

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