

Claims

1. A detection device (100, 200) for detecting charged particles or radiation, the device comprising a front area (102, 202) extending longitudinally along a principal direction (A),
5 the front area comprising an arrangement of the respective entry faces (112, 212) of at least two microchannel plate, MCP, assemblies (110, 210), wherein each MCP assembly is configured for receiving charged particles, neutral particles or electromagnetic radiation (10) that impinge on its entry face and for generating a corresponding amplified detection signal on its opposite exit face (114, 214), the device further comprising at least one read-
10 out anode (120, 220) for collecting said amplified detection signals, the anode being arranged at a distance to, and in parallel with the respective exit faces of said MCP assemblies,
wherein the at least two MCP assemblies are arranged side by side along said principal direction, and wherein a gap (G) of at most 1 mm separates the entry faces of any two
15 adjacent MCP assemblies, characterized in that
the detection device further comprises biasing means configured for applying a common electric potential to the respective exit faces (114, 214) of all MCP assemblies (110, 120), and for applying individual electric potentials to the respective entry faces (112, 212) of each MCP assembly (110, 120).
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2. The device according to claim 1, wherein the entry faces (112, 212) of the at least two MCP assemblies (110, 210) extend over an aggregated distance of at least 15 cm.
3. The device according to any of claims 1 or 2, wherein the device comprises one dedicated
25 read-out anode (220, 220') for each MCP assembly (210, 210'), and wherein said read-out anode extends along the MCP assembly's exit face (214).
4. The device according to claim 3, wherein the read-out anodes (220, 220') comprise delay-
30 line anodes, pixelated anode arrays, resistive anodes, shaped anodes, single anodes or any combination thereof.
5. The device according to any of claim 1 to 4, wherein a gap of at most 1 mm width separates the respective exit faces (114, 214) of any two adjacent MCP assemblies.
- 35 6. The device according claims 3 and 5, wherein the gap separating any two adjacent read-out anodes has substantially the same width as the gap separating the entry and exit faces of the corresponding two adjacent MCP assemblies.

7. The device according to any of claims 1 to 6, wherein all MCP assemblies (110, 210) have substantially the same channel size and amplification gain characteristics.
- 5 8. The device according to any of claims 1 to 7, wherein all MCP assemblies (110, 210) have the same width (W) extending perpendicularly to said principal direction (A).
9. The device according to any of claims 1 to 8, wherein said front area (102, 202) consists of the entry faces (112, 212) of said MCP assemblies (110, 210).
- 10 10. The device according to any of claims 1 to 9, wherein said biasing means are configured for applying an electric potential difference between the respective entry (112, 212) and exit faces (114, 214) of each MCP assembly (110, 210).
- 15 11. The device according to claim 10, wherein the biasing means are configured for applying a positive or negative floating electric potential to the detector's front area (102, 202).
12. The device according to any of claims 1 to 11, wherein the MCP assemblies comprise a stacked assembly of a plurality of multiple MCP devices, a chevron assembly or a Z-stacked assembly.
- 20 13. The device according to any of claims 1 to 12, wherein said charged particles comprise ions.
- 25 14. The device according to any of claims 1 to 12, wherein said electromagnetic radiation comprises visible light.
15. A mass spectrometer for dispersing ions along a focal plane in accordance with their mass/charge ratio, the spectrometer comprising a detection device that is arranged on said focal plane so that said dispersed ions impinge on the detection device's front area, characterized in that said detection device is a device according to any of claims 1 to 14.
- 30 16. The mass spectrometer device according to claim 15, characterized in that it is a Mattauch-Herzog type device.
- 35 17. The mass spectrometer device according to any of claims 15 or 16, characterized in that it is configured for being used in a floating configuration.