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Response of microchannel plates in ionization mode to single particles and electromagnetic showers

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## Response of microchannel plates in ionization mode to single particles and electromagnetic showers

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### Abstract

Hundreds of concurrent collisions per bunch crossing are expected at future hadron colliders. Precision timing calorimetry has been advocated as a way to mitigate the pileup effects and, thanks to their excellent time resolution, microchannel plates (MCPs) are good candidate detectors for this goal. We report on the response of MCPs, used as secondary emission detectors, to single relativistic particles and to electromagnetic showers. Several prototypes, with different geometries and characteristics, were exposed to particle beams at the INFN-LNF Beam Test Facility and at CERN. Their time resolution and efficiency are measured for single particles and as a function of the multiplicity of particles. Efficiencies between 50% and 90% to single relativistic particles are reached, and up to 100% in presence of a large number of particles. Time resolutions between 20 ps and 30 ps are obtained.

*Keywords:* Microchannel plates, secondary emission,

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<sup>1</sup>Now at CERN

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