

Efficiency of modern fast photo detectors

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Content

The original mathematical models and algorithms developed within the code “Monte Carlo Simulator 3D” (MCS-3D) are presented. These algorithms are devoted to model the photo-emission and cascades of secondary electron emission in micro-channel plate (MCP) amplifiers are widely used as photo detectors in accelerator physics, medical diagnostics, astrophysics etc. A theoretical method for calculation of secondary electron emission (SEE) yields has been developed. The method uses Monte Carlo simulation, empirical theories and close comparison to experimental data in order to parameterize the SEE yields of highly emissive materials for the MCPs. Numerical simulations were used to study the statistical properties for the prototype of large-area fast photo detectors which was developed at Argonne National Laboratory.

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