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## Certain effects of field and light induced electron emission from indium thin oxide (ITO) layers

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### Keywords

semiconductor, electric field, optical properties, indium tin oxide (ITO), MIS- structure, field effect, electron emission

### Abstract

Indium thin oxide (ITO) layers were deposited onto both surfaces of a glass substrate. One of the layers was a field electrode and negative voltage has been applied to it in order to create the internal electric field. Another one was treated as the electron-emitting layer. The studies were carried out in the  $10^{-7}$  hPa vacuum. As a result of applying polarizing voltage  $U_{pol}$  and illuminating by a quartz lamp, photoelectrons are released and enter the electron multiplier. Voltage pulses from the multiplier are recorded in the multichannel amplitude analyzer, creating so-called voltage pulse amplitude spectrum. Dependence of electron emission yield on both the intensity of internal field and illumination was measured. With the increasing the  $U_{pol}$  voltage, the count frequency of pulses grows monotonically. At higher  $U_{pol}$  ( $> |-1$  kV) this dependence is exponential. After illuminating the yield of the field induced electron emission grows as well. The cascade multiplication of electrons, which is responsible for the high emission yield, develops under the influence of the electric field of the order of 1 MV/m. The Gauss approximation suggests that the internal electric field in the interface between a glass and ITO layer has to be taken into account.



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