

微光技术

三代像增强器用微通道板的改进与发展

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摘要 简要说明了三代像增强器的特点, 分析了微通道板的离子反馈形成机理, 给出有效抑制离子反馈对光阴极造成伤害的2种方法, 即一种是减少和清除微通道板的吸附气体, 另一种是阻止反馈离子反馈到光阴极上。介绍了国外最新的三代像增强器, 以及使用优化改进的高性能微通道板显著减薄甚至彻底去除微通道板离子反馈膜的方法, 该方法能维持砷化镓光阴极足够长的工作寿命, 还介绍了最新发展的体导电微通道板和硅微通道板。指出高可靠性无膜选通砷化镓像增强器技术的实现, 不仅需要微通道板在抑制离子反馈方面取得突破, 还需要砷化镓光阴极在耐受离子反馈能力上进一步提高, 同时还要结合和拓展选通电源的应用。

关键词 [三代像增强器](#) [砷化镓光阴极](#) [微通道板](#) [离子反馈](#) [无膜选通砷化镓光阴极像增强器](#)

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Development of microchannel plate used for 3rd generation image intensifier

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Abstract The paper reviews the ion barrier adopted in 3rd generation image intensifier, which has dual effects on the GaAs photocathode, protecting it from being damaged by ion feedback, at the same time degrading the quantum efficiency. The origin of pernicious gases and the formation mechanism of ion feedback are explored, then some restraint techniques are introduced, including the latest developed GaAs image intensifiers with a high performance MCP as its feature, which made the film significantly thinner or even removed due to the large reduction of pernicious gases. The latest bulk conductive MCP and Si MCP with excellent advantage on restraining ion feedback are exhibited. The development of long life filmless GaAs image intensifier remains a great challenge. Further progress in MCP is needed to restrain ion feedback, and the GaAs photocathode's resistance to ionized and native gases still needs enhancing.

Key words [GenIII image intensifier](#) [GaAs photocathode](#) [microchannel plate](#) [ion feedback](#) [unfilmed auto gating GaAs photocathode image intensifier](#)

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