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Performance of a multi-anode photomultiplier employing a ultra bi-alkali photo cathode and ragged dynodes

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We report on the performance test of a multi-anode photomultiplier (MAPMT) R8900-M16-UBA newly developed by Hamamatsu Photonics K.K. A great advantage of R8900 series is a highly sensitive surface ($> 80\%$ of physical area), but the quantum efficiency (QE) was relatively low ($\sim 20\%$). In this paper, we have made two substantial changes on R8900-M16 : (1) to improve the QE to 40% level, by employing a ultra bi-alkali (UBA) photo-cathode, and (2) to construct a ragged dynode which endure a vibration for future use in space. We measured each pixel signals at single photo-electron level and signals of scintillation photons using a 16-pixel plastic scintillator array. Thanks to high QE, good energy resolution of 29.9% (FWHM) was obtained for 59.5keV gamma-rays. Tolerance to the vibration in the possible launching vehicles will be also discussed.

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