A Study on the MCP Detection System for FIMS

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FIMS on the satellite, KAISTSAT-4, which will be launched in the year 2002, will perform space astronomy mission of point source observation, all sky survey, emission line of diffuse source observation, air glow and auroral observation. To meet the scientific requirement, we have designed spectrographic system which has spectral resolution of 1.5~2Å and imaging resolution of 5′. These angular resolutions correspond to linear dimension of ~100um and ~250um on the focal plane, if we use 60x30mm MCP. However, MCP detection system is composed of 3 major parts, MCP, anode and detection electronics. Among these, anode and detection electronics mainly determine the resolution of the detection system. In general, detection system should be designed to have 3 ~ 4 times better resolution than the spectrograph, because of the digitization error. And also, anode and detection electronics are different for the different position encoding method, which is classified into discrete and continuous encoding. However, continuous encoding method have advantages in simplicity, reliability, mass, and power consumption, which is very important design features of space astronomy application. Until now, WSZ anode system and cross/double delay line anode system which satisfy the requirement for resolution and spacecraft constraints, are considered to be powerful candidates of our detection system. Hence, in this study, we have investigated the characteristics of these two detection systems, conceptually designed detection electronics, and analyzed possible error contributions of each design element to the resolution of detection system.