

ZnO thin film transistors and electronic connections for adjustable X-ray mirrors: SMART-X telescope

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ABSTRACT

The proposed SMART-X telescope consists of a pixelated array of a piezoelectric lead zirconate titanate (PZT) thin film deposited on flexible glass substrates. These cells or pixels are used to actively control the overall shape of the mirror surface. It is anticipated that the telescope will consist of 8,000 mirror panels with 400-800 cells on each panel. This creates an enormous number (6.4 million) of traces and contacts needed to address the PZT. In order to simplify the design, a row/column addressing scheme using ZnO thin film transistors (TFTs) is proposed. In addition, connection of the gate and drain lines on the mirror segment to an external supply via a flexible cable was investigated through use of an anisotropic conductive film (ACF). This paper outlines the design of the ZnO TFTs, use of ACF for bonding, and describes a specially designed electronics box with associated software to address the desired cells.