

Adjustable Grazing Incidence X-ray Optics Based on Thin PZT films

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The direct deposition of piezoelectric thin films on thin substrates offers an appealing technology for the realization of lightweight adjustable mirrors capable of sub-arcsecond resolution. This solution will make it possible to realize X-ray telescopes with both large effective area and exceptional angular resolution and, in particular, it will enable the realization of the adjustable optics for the proposed mission Square Meter Arcsecond Resolution X-ray Telescope (SMART-X).

In the past years we demonstrated for the first time the possibility of depositing a working piezoelectric thin film (1-5 μm) made of lead-zirconate-titanate (PZT) on glass. Here we review the recent progress in film deposition and influence function characterization and comparison with finite element models. The suitability of the deposited films is analyzed and some constraints on the piezoelectric film performances are derived. The future steps in the development of the technology are described.