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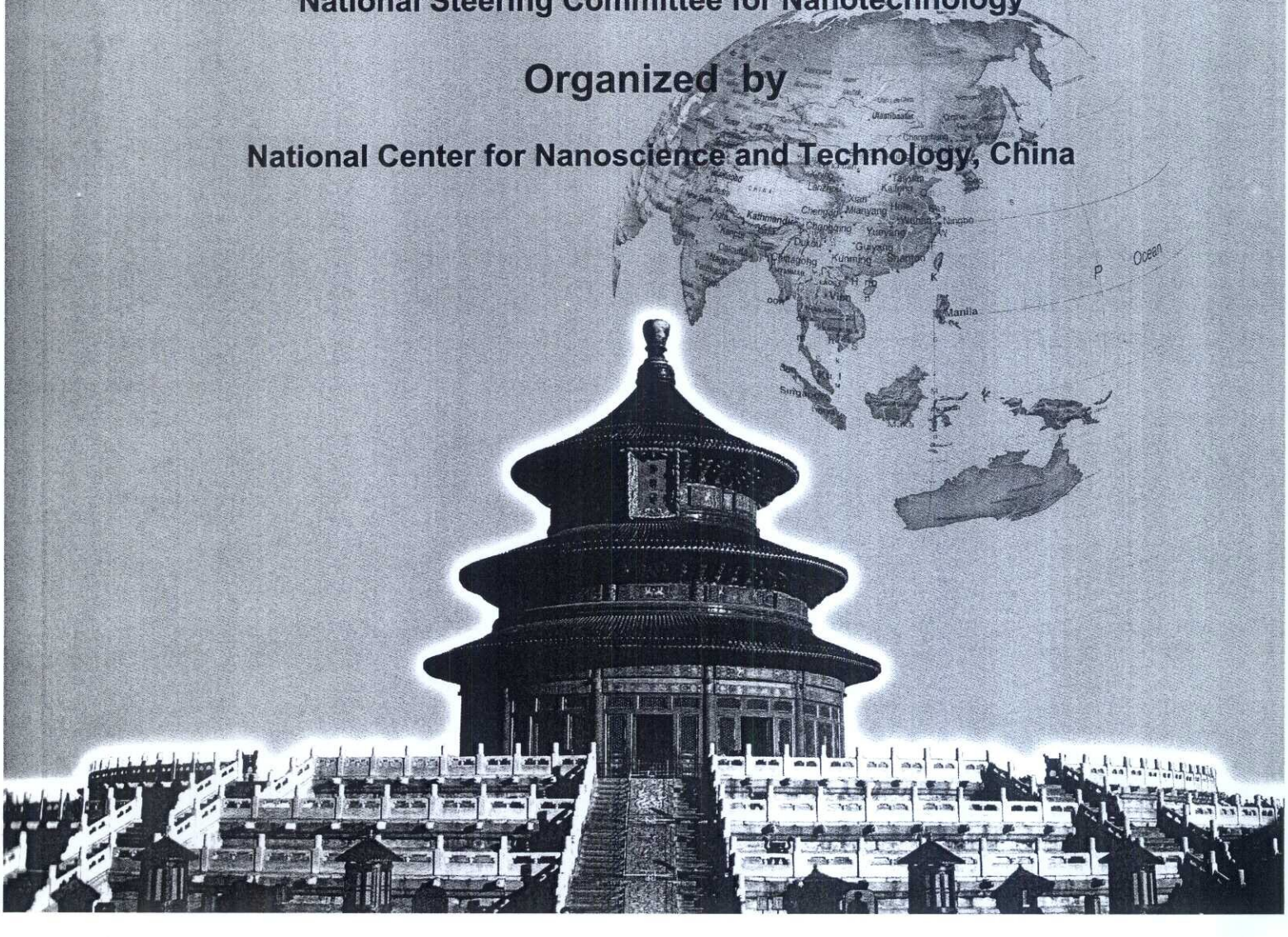

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crystals with artificial point, line, and planar defects as well as 3D photonic crystals with a dual periodicity.

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5P-2166

A Novel Micro xy-Stage Platform for Large Displacement and Precise Control

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Keywords: thermal actuator, piezoresistive sensor, micro xy-stage, chevron beam

Abstract: Micro xy-stage is commonly used in precision instruments such as data storage, atomic force microscope and micro optical systems etc. to either manipulate or detect micro/nano elements. The tradeoffs between the driven method, available fabrication process, the cost and high efficiency are the focus for the design and optimization, as presented by researchers based on the fundamentals of electrostatic, electromagnetic and piezoelectric mechanisms [1, 2].

In this paper, we proposed a novel micro xy-stage for large displacement and precise control. It is based on chevron beams to be used as the horizontal thermal actuator, integrated piezoresistive sensors. The amplified displacement in x axis is obtained from the horizontal movement in y axis of the parallel thermal actuator, which is an analog of the conventional V-beam actuator, while with free constraint at the 'anchor' to increase the amplitude of the displacement. The optimization is performed on the integrated system using finite element method to improve the efficiency and avoid mechanical coupling effect. Two piezoresistors are integrated on the base area of the flexure of each parallel thermal actuator, which are subjected to tensile and compression stress respectively. Half-Wheatstone bridge is configured to increase the sensitivity of the piezoresistive sensor. The total micro xy-stage size is 9mm×9mm, which can generate nearly 40 μm displacement, and only 2.4 voltage is required.

The proposed micro xy-stage is easily fabricated and the measurement results demonstrate the high efficiency compared with other design. The characterization is performed on-chip and precise control is realised by using the integrated high sensitive piezoresistive sensor. The details will be presented on the conference.

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5P-2167

Synthesis and Characteristics of Sb_2O_3 Nanowires Prepared by Heating the Sb_2S_3 Powders

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Abstract: Since the discovery of carbon nanotubes, one-dimensional (1D) nanoscale materials have drawn much attention due to their peculiar and interesting physical properties and potential device applications. Antimony oxide (Sb_2O_3) is an important member of V-VI main group compounds and has been widely used in industry [1]. It has a variety of applications including fire retardant, filling and covering agent, catalytic agents in organic synthesis, and semiconductor material with unique optical and optoelectronic properties. Accordingly, Sb_2O_3 nanowires have been synthesized by various methods including a solution route [1]. In the present paper, we have synthesized Sb_2O_3 nanowires by heating the solid powders, which is simple and controllable. In addition, we have investigated their properties, such as structure and luminescence.

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5P-2168

Effect of Magnetite Nanoparticles on Poly(methyl methacrylate) Nanobeads