

## عنوان مقاله:

Design and Analysis of a Novel ۶-Axes Compliant Nano-Positioner

## محل انتشار:

دومین کنگره بین المللی علوم و فناوری نانو (سال: ۱۳۸۷)

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## خلاصه مقاله:

High precision positioning is required in many applications such as micromachining, scanning probe (like scanning tunneling, atomic force) microscopy and optoelectronic for fiber aligning [1]. In optoelectronic devices where a fiber comes along with another fiber or a laser diode requires to be aligned precisely in at least ۵ axes. But unfortunately, traditional positioning technology cannot be extended to miniature six-axis machines required in nano and micro technology applications. The fundamental elements of six-axis positioners (i.e. spherical /revolute joints, bearings, actuators, etc.) are designed for compatibility with macro-scale fabrication processes beside the fact they suffer from friction, wear and backlash that decrease the accuracy. Sometimes clearance in the traditional joints exceeds the workspace of a precision positioner. In order to eliminate backlash and friction mostly monolithic flexure hinges are replaced by conventional kinematic pairs [۲,۳]. On the other hand due to the monolithic structure of the flexure hinged mechanisms, they could easily be fabricated in the micro scale with the standard micro fabrication methods [۴-۶]. In this paper, a new ۶ axes nano positioner is designed. This Compliant mechanism utilizes a unique design of flexure hinges and novel integrated micro actuator to achieve both in-plane and out of plane positioning beside its monolithic and planar structure. The actuators are thermoelectrically actuated and are capable of exerting large forces and displacement in ۲ degrees of freedom and both directions in their transverse DOF. Analytical and numerical analysis of the actuators are then performed and compared and Results are in good agreement with each other

## کلمات کلیدی:

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