



## **TWO-WHEELED PIEZOELECTRIC SYSTEM**

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**ABSTRACT**—Two-wheeled piezoelectric system is proposed for applications in micro-stepping displacement devices. The system includes a beam and two displacement members which are respectively pivoted on the beam. Two displacement members are not rotatable. In addition, each displacement member includes a wheel sheet and a piezoelectricity element embedded on its surface. When the piezoelectricity element generates and transmits power to the wheel sheet, the wheel induces vibration and deformation. Therefore, due to the wheel sheets and the touched ground involving their relative motion, the displacement device can move and orient its motion direction in a micro manner. The wheel piezoelectric system is direct movement, no rotor requirement. In this research, a 3-D mechanical element with an extra electrical degree of freedom is employed to simulate the dynamic vibration modes of the linear piezoelectric, mechanical and piezoelectric-mechanic behaviours of the wheel piezoelectric system.

**Key Words:** Micro-stepping; Wheel piezoelectric system