

### Folded-Beam Stiffness Ratios

- In the x-direction:
 
$$k_x = \frac{24EI_z}{L^3}$$
- In the z-direction:
  - Same flexure and boundary conditions
$$k_z = \frac{24EI_x}{L^3}$$
- In the y-direction:
  - [See Senturia, §9.2]
$$k_y = \frac{8EWh}{L}$$
- Thus:
 
$$\frac{k_y}{k_x} = 4 \left( \frac{L}{W} \right)^2$$

Much stiffer in y-direction!

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### Folded-Beam Suspensions Permeate MEMS

Accelerometer [ADXL-05, Analog Devices]    Gyroscope [Draper Labs.]

Micromechanical Filter [K. Wang, Univ. of Michigan]

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### Folded-Beam Suspensions Permeate MEMS

- Below:** Micro-Oven Controlled Folded-Beam Resonator

Temperature Sensing Resistor    Heating Resistor

Support Struts    Substrate Edge    Micro-Platform

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