Folded-Flexure Suspension Variants

* Below: just a subset of the different versions
* All can be analyzed in a similar fashion

[From Michael Judy, Ph.D. Thesis, EECS, UC Berkeley, 1994]

Folded-Beam Stiffness Ratios

- In the x-direction:
  \[ k_x = \frac{24EI_z}{L^3} \]
- In the z-direction:
  \[ k_z = \frac{24EI_x}{L^3} \]
- In the y-direction:
  \[ k_y = \frac{8EWh}{L} \]
  
  [See Senturia, §9.2]

Thus:
  \[ \frac{k_y}{k_z} = \frac{4(L/W)^2}{1} \]
  Much stiffer in y-direction!

Folded-Beam Suspensions Permeate MEMS

* Below: Micro-Oven Controlled Folded-Beam Resonator

Accelerometer [ADXL-05, Analog Devices]
Gyroscope [Draper Labs.]
Micromechanical Filter [K. Wang, Univ. of Michigan]