Electrostatic Motors
- comb drives
- wobble motors
- gap closers
- wobble motors
- scratch drive
- inchworms

Scratch drive

Inchworm motors

Some disagreement about how they work?
- Sometimes run backwards
- Careful choice of voltage & freq.
- Small steps, big forces
- Not very efficient (electrical power in to mechanical power)

\[ F = \frac{1}{2} \varepsilon_0 n^2 \frac{A}{q^2} \]

Big forces if gap is small
- e.g. \( V = 15 \text{V}, A = 1 \text{mm}^2, q = 1 \text{mm} \)

\[ F = (10^9 \text{N}) \frac{1}{10^6} = 1 \text{mN} \]

Drive

Clutch

Shuttle