

Electronic Supplementary Information 5 (ESI_5)

The movies show the rotation of the microgears in an external magnetic field of strength B and rotation frequency f_{field} :

Movie1: 9-tooth microgear, $B = 1 \text{ mT}$, $f_{\text{field}}=0.6 \text{ Hz}$

Movie2: 9-tooth microgear, $B = 1 \text{ mT}$, $f_{\text{field}}=7 \text{ Hz}$

Movie3: 9-tooth microgear, $B = 1.5 \text{ mT}$, $f_{\text{field}}=3 \text{ Hz}$

Movie4: 11-tooth microgear, $B = 2 \text{ mT}$, $f_{\text{field}}=0.6 \text{ Hz}$

Movie5: magnetic and non-magnetic microgear, $B = 1 \text{ mT}$, $f_{\text{field}}=7\text{Hz}$

Movie6: magnetic and non-magnetic microgear, $B = 1 \text{ mT}$, $f_{\text{field}}=20\text{Hz}$

Movie7: three microgears, $B = 1 \text{ mT}$, $f_{\text{field}}=7\text{Hz}$