

## Supplementary information for the manuscript ‘Design principles for helices with tunable pitch and Bernal spirals’

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## **I. SUPPLEMENTARY MOVIE 1 LEGEND**

This movie shows the fastest rearrangement mechanism between a 20 particle Bernal spiral and a symmetrical cyclic structure, which is a kinetic trap on the energy landscape for 20 particles. The first four rearrangements along the pathway are low-energy ‘hinge’ motions.

## **II. SUPPLEMENTARY MOVIE 2 LEGEND**

This movie shows the fastest pathway for inverting the chirality of a left-handed  $N = 24$  helical structure. The rearrangement proceeds exclusively through low-energy ‘hinge’ motions.

## **III. SUPPLEMENTARY MOVIE 3 LEGEND**

This movie shows the transformation of a 24-particle spiral into a highly symmetric ‘donut’-structure, which is the global minimum for this number of particles. The second rearrangement along the pathway has a high energy barrier, and corresponds to a change in dimerization pattern between the four particles at the lower end of the helix. All other motions are low-energy ‘hinge’ rearrangements.