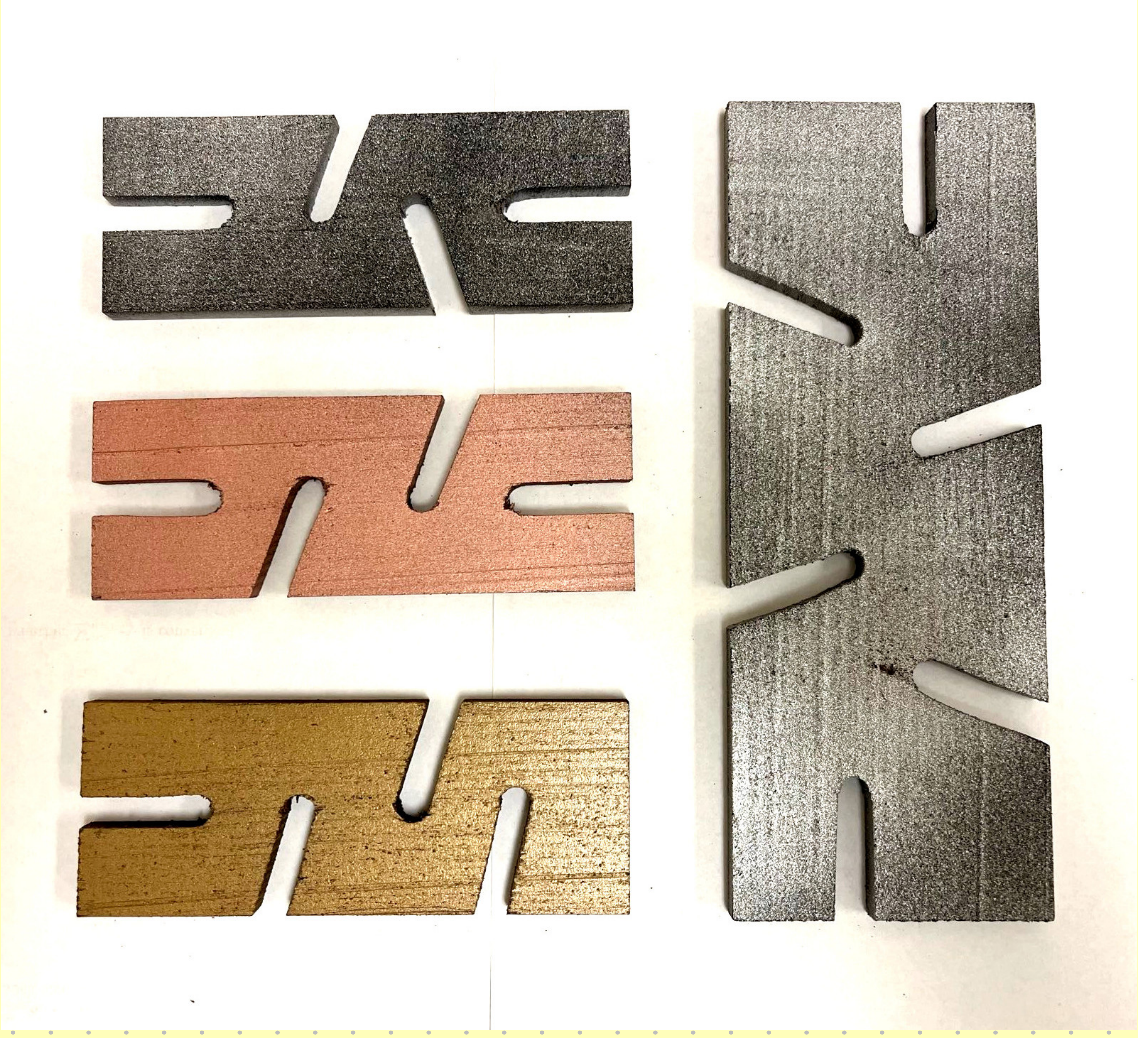
AN APERIODIC MODULAR SCULPTURE

SHINTARO FUSHIDA-HARDY,
JOINT WITH PETER HUXFORD

SHINTARO FUSHIDA-HARDY, WITH PETER HUXFORD

IN PRESS: A MODULAR SCULPTURE CORRESPONDING TO THREE ROTATIONS

BRIDGES CONFERENCE PROCEEDINGS 2024



FLOWERMOUNTAIN, 2022

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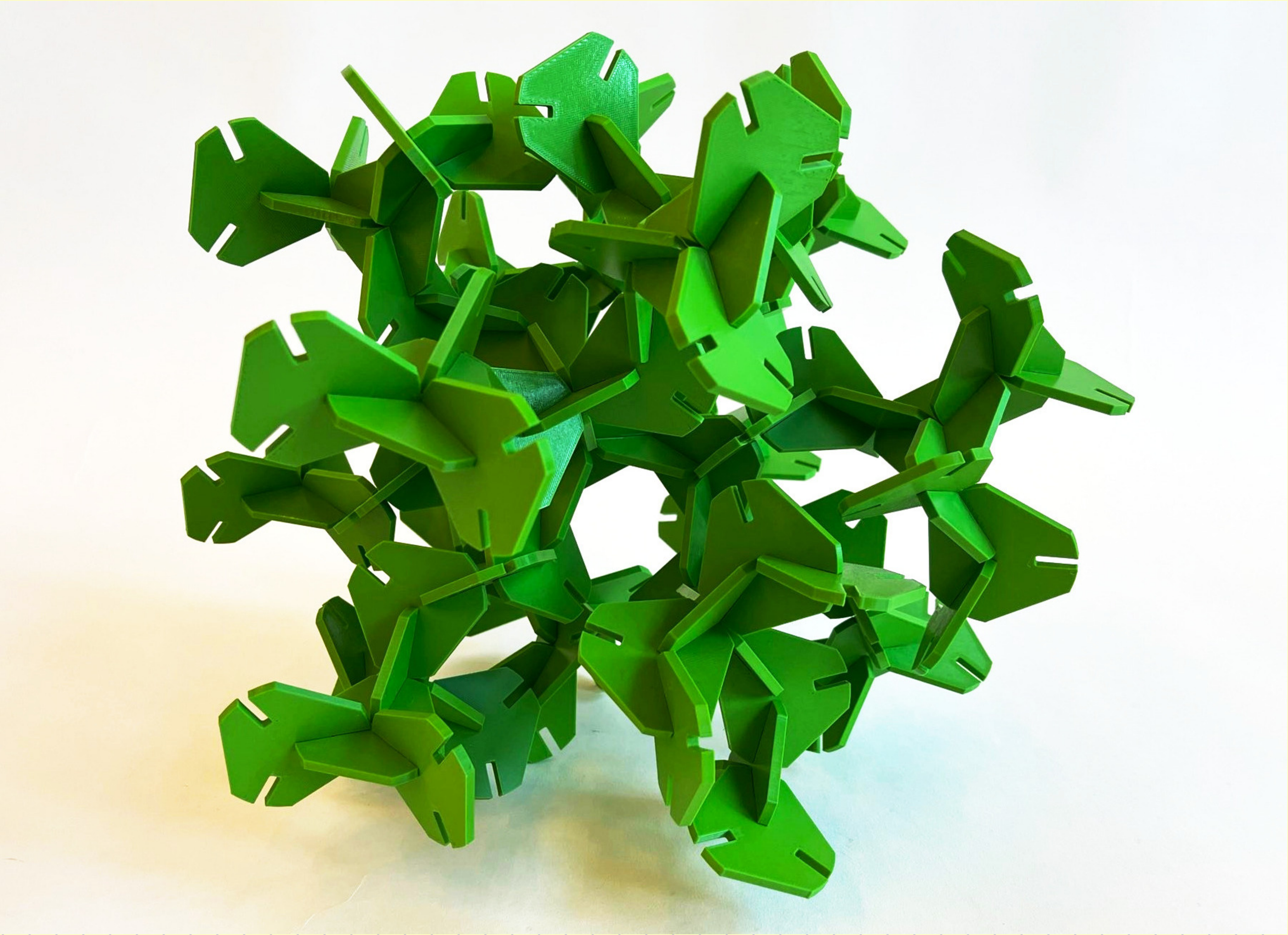

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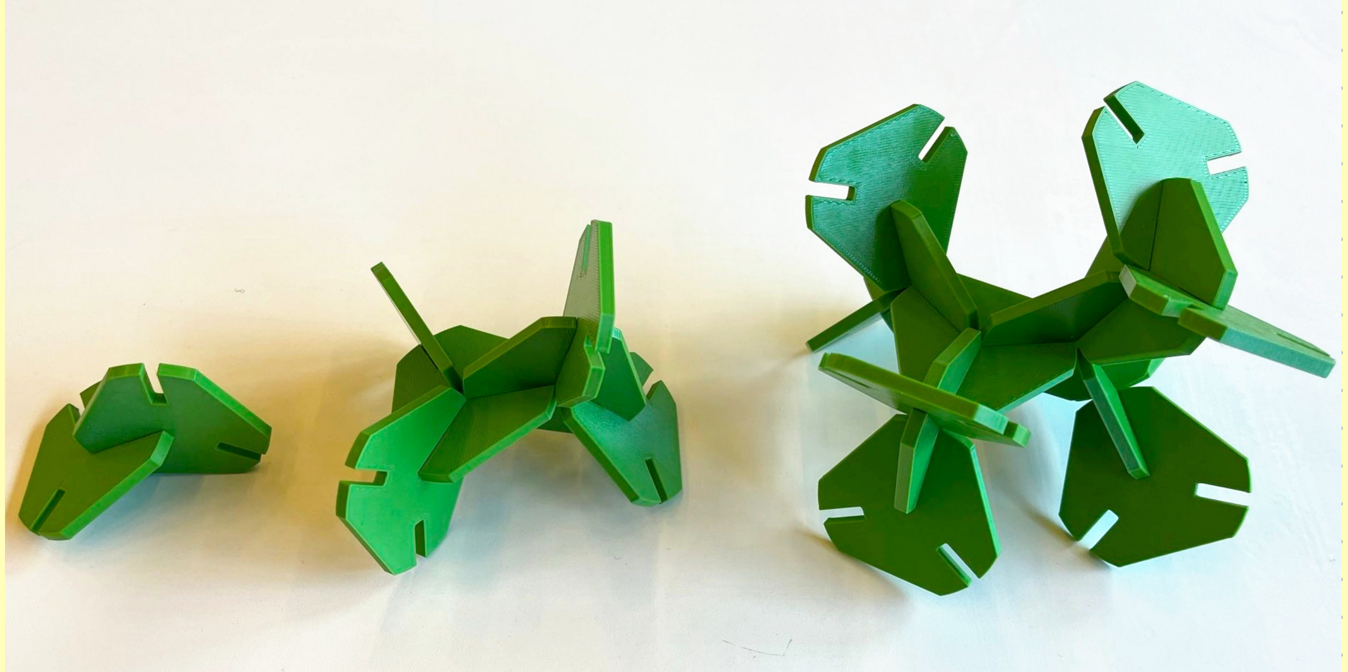

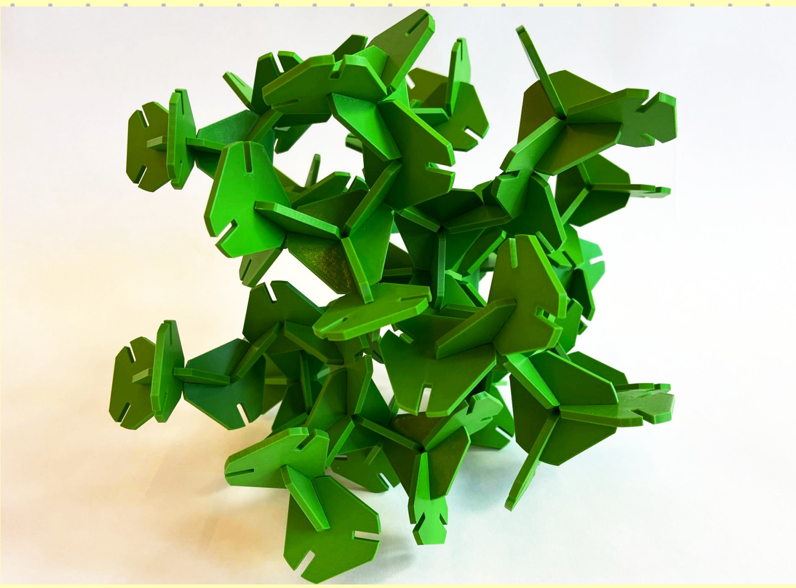

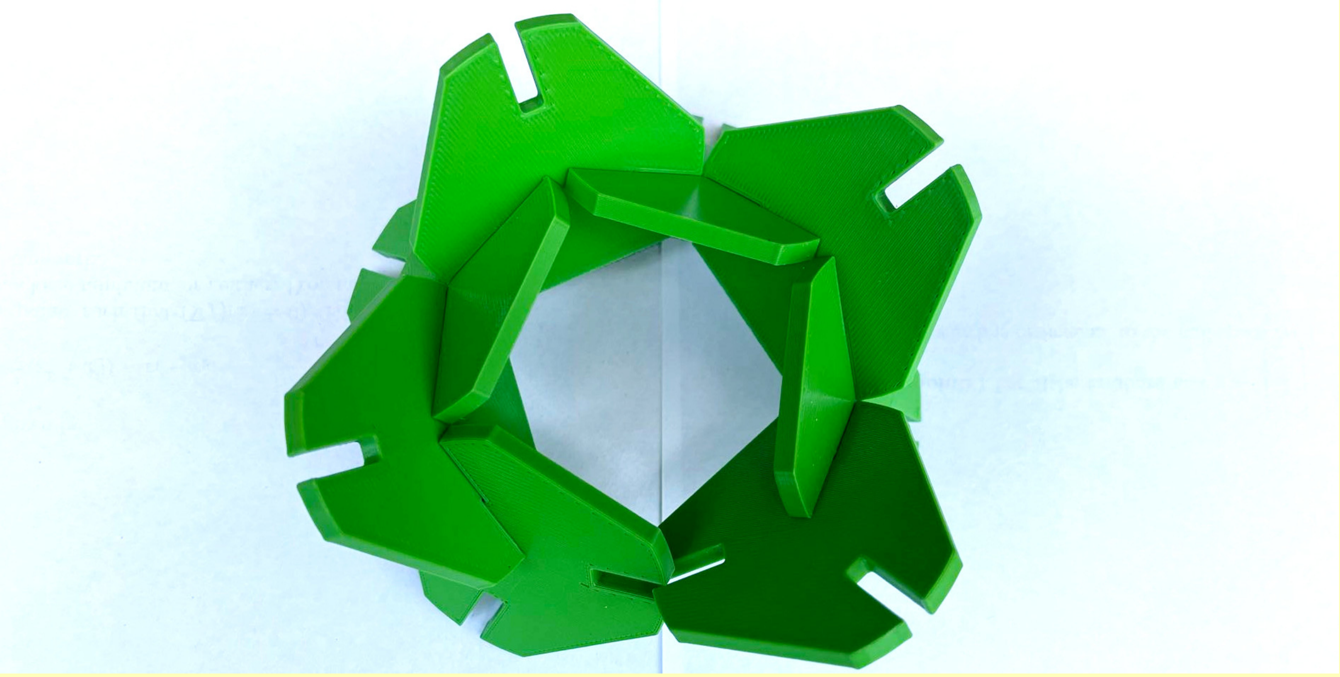

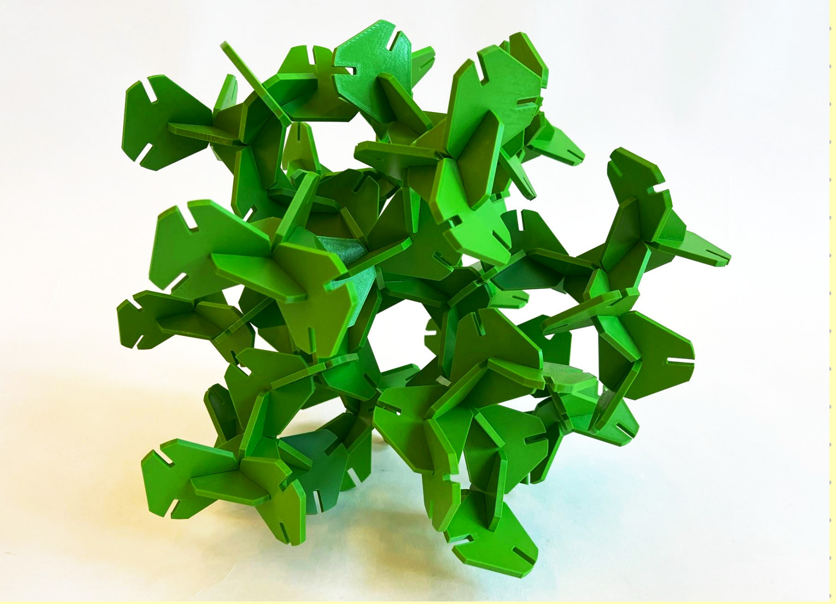

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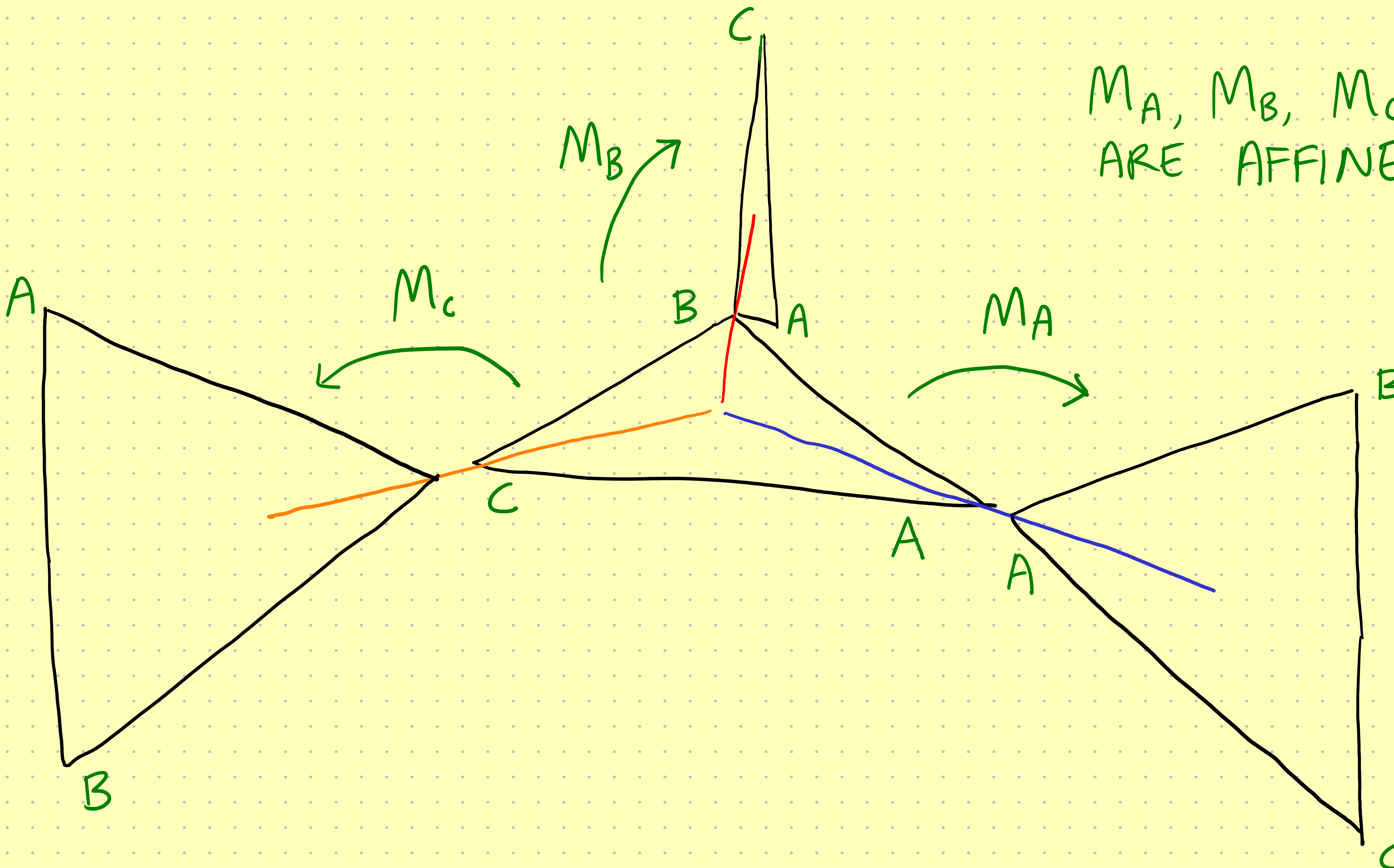
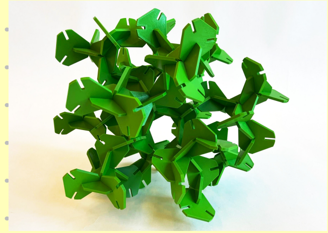
M_A, M_B, M_C ARE AFFINE



ROTATIONAL PARTS:

$$\mathrm{ROT}(M_A) = a = \begin{pmatrix} -1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}, \quad b = \frac{1}{4}\begin{pmatrix} -1 & -\sqrt{3} & 2\sqrt{3} \\ -\sqrt{3} & -3 & -2 \\ 2\sqrt{3} & -2 & 0 \end{pmatrix}, \quad c = \frac{1}{4}\begin{pmatrix} -1 & \sqrt{3} & -2\sqrt{3} \\ \sqrt{3} & -3 & -2 \\ -2\sqrt{3} & -2 & 0 \end{pmatrix}$$

"WHAT ARE THE SYMMETRIES OF  " $\longleftrightarrow$ " WHAT IS $\langle a, b, c \rangle$ "

CONJECTURE:

$$\langle a, b, c \rangle = \langle a \rangle * \langle b \rangle * \langle c \rangle$$

$$= \mathbb{Z}/2\mathbb{Z} * \mathbb{Z}/2\mathbb{Z} * \mathbb{Z}/2\mathbb{Z}$$

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EQUIVALENT REFORMULATION: "IS $\langle ba, ac \rangle \approx F_2$?"

HOW CAN WE PROVE THIS?

- PING-PONG LEMMA IN $\mathbb{R}^3$, $SO(3,\mathbb{R})$ ETC ✗
- STATE OF THE ART:
  - CHOOSE SOME p, RUN ALGORITHM IN $SL(2, \mathbb{Q}_p)$. (CONDER, 2020) ✗

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DOLGACHEV, ALLCOCK PROVED "ROTATIONS ABOUT DIAGONALS OF A CUBE" ARE APERIODIC.

THANK YOU!