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**Observation of Flat Frequency Bands at Open Edges and Antiphase Boundary Seams in Topological Mechanical Metamaterials<sup>1</sup>** KAI QIAN, New Jersey Institute of Technology, LINGHUA ZHU, Virginia Tech, KEUN HYUK AHN, CAMELIA PRODAN, New Jersey Institute of Technology — In this talk, we report the observation of the flat frequency bands of the topological origin at open edges and antiphase boundary seams in mechanical metamaterials [1], as predicted by the recent theoretical studies on a two-dimensional chiral Hamiltonian [2]. It is experimentally and computationally demonstrated that topological flat bands can occur at open edges of planar systems and antiphase boundary seams of ring or tubular systems. We also show that the flatness of the edge bands and the size of the localized states can be controlled by the distance between open edges, and compare with the theory. This study suggests that similar flat bands could occur in other metamaterials, such as photonic crystals and electronic metamaterials. Reference: [1] K. Qian, L. Zhu, K. H. Ahn, and C. Prodan, Phys. Rev. Lett. (accepted). [2] L. Zhu, E. Prodan, and K. H. Ahn, Phys. Rev. B 99, 041117(R) (2019).

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