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How far could energy transport within a single crystal. YIFAN ZHANG[1], Institute of Chemistry, Chinese Academy of Sciences , YANKE CHE, JINCAI ZHAO, ICCAS, GRANICK STEVE, Institute for Basic Science — Efficient transport of excitation energy over long distance is a vital process in light-harvesting systems and molecular electronics. The energy transfer distance is largely restricted by the probability decay of the exciton when hopping within a single crystal. Here, we fabricated an organic single crystal within which the energy could transfer more than 100 μm, a distance only limited by its crystal size. Our system could be regarded as a "Sprint relay game" performing on different surface of tracks. Photoinduced "athletes" (excitons) triggered intermolecular "domino" reaction to propagate energy for a long distance. In addition, athletes with the same ability runs much farther on smooth ideal track (single crystal assembled from merely van der Waals interaction) than bumpy mud track (crystal assembled from combination of pi-stacking, hydrogen bond and van der Waals interactions). Our finding presents new physics on enhancing energy transfer length within a single crystal.

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