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Supporting Kibble-Zurek Mechanism in Quantum Ising Model through a Trapped Ion. CHANGKANG HU, JINMING CUI, YUNFENG HUANG, ZHAO WANG, DONGYANG CAO, JIAN WANG, WEIMIN LV, YONG LU, University of Science and Technology of China, LE LUO, Indiana University-Purdue University Indianapolis, ADOLFO CAMPO, University of Massachusetts Boston, YONGJIAN HAN, CHUANFENG LI, GUANGCAN GUO, University of Science and Technology of China — The Kibble-Zurek mechanism is the paradigm to account for the non adiabatic dynamics of a system across a phase transition. Its study in the quantum regime is hindered by the requisite of ground state cooling. We report the experimental quantum simulation of critical dynamics in the transverse-field Ising model by a set of Landau-Zener crossings in pseudo-momentum space, that can be probed with high accuracy using a single trapped ion. Our results support the Kibble-Zurek mechanism in the quantum regime and advance the quantum simulation of critical systems far-away from equilibrium.

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