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Quasi-1D intermittent flux dynamics in superconducting films TOM H. JOHANSEN, ATLE J. QVILLER, VITALIY V. YURCHENKO, JORN I. VESTGARDEN, Dept. of Physics, University of Oslo, Norway, PETER B. MOZHAEV, JORN B. HANSEN, Dept. of Physics, Technical University of Denmark, Lyngby, Denmark, YURI M. GALPERIN, Dept. of Physics, University of Oslo, Norway — The stability of pinned vortex systems is constantly challenged in superconductors. In this work, magneto-optical imaging was used to reveal a new type of intermittent flux behavior in films of $YBa_2Cu_3O_x$. Films were grown on tilted $NdGaO_3$ substrates, where the terrace structure creates a high density of planar defects. The flux penetration along the terrace steps consists of numerous 1-dimensional avalanches, some starting at the film edge, some fully internal. In spite the vivid dynamics the flux front advances in accordance with the critical state model. Analysing more than 10000 avalanche events, we find a power-law size distribution and finite-size-scaling with the depth of the flux front as crossover length. The intermittent behaviour shows no threshold value in the applied field. These new characteristics largely contrast those of the thermo-magnetic avalanches observed in many superconducting films, and suggest that a different mechanism is responsible for the 1-dimensional avalanches.

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