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Matching Effect and Dynamic Phases of Vortex Matter in $Bi_2Sr_2CaCu_2O_8$ Nanoribbon With a Periodic Array of Holes[1] SEVDA AVCI, ZHILI XIAO, JIONG HUA, Northern Illinois University, ALEXANDRA IMRE, Argonne National Laboratory, MICHAEL LATIMER, Northern Illinois University, ULRICH WELP, WAI-KWONG KWOK, Argonne National Laboratory — $Bi_2Sr_2CaCu_2O_8$ nanoribbons with a periodic square array of nanoscale holes were fabricated through focused ion beam milling. Systematic resistive measurements over an extended temperature range enabled us to investigate phenomena associated with the matching effect in a vortex matter with periodic pinning. We found a novel feature of the vortex matching effect, namely that it is enhanced near the melting field due to the presence of soft solids and a mixture of solid-liquid phases. We also observed driving current dependent appearance of the matching effect and striking features in the voltage-current behavior associated with various driven regimes of the vortex matter related to vortex dynamic phase transitions.

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