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Non-flux avalanches in the tunneling density of states of a superconductor in a high Zeeman field JOSEPH PRESTIGIACOMO, PHILIP ADAMS, Louisiana State Univ - Baton Rouge — We report an ongoing experimental study of the effects of disorder and temperature on the glassy dynamics of the Zeeman-limited critical field transition in ultrathin Al films. We have measured the tunneling density of states of the films through the first-order parallel critical field transition. We find that films with sheet resistance of a few hundred ohms exhibit large avalanches on the superheating branch of the critical field hysteresis loop. In contrast, the transition back into the superconducting phase (i.e., along the supercooling branch) is always continuous. Similar avalanche behavior is also observed in transport. We will discuss what our results imply about nature of the superconducting order parameter in the regime where the Zeeman splitting is of the order of the superconducting gap energy.

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