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Near-extremal-spin Black Hole: New Initial Data and Evolution YUK TUNG LIU, ZACHARIAH ETIENNE, STUART SHAPIRO, University of Illinois at Urbana Champaign — We present new initial data for rapidly spinning black holes (BHs) that can be evolved using the standard moving puncture technique. Unlike conformally-flat initial data, our initial data can produce a BH spin very close to the extreme Kerr limit. In addition, our initial data do not contain spurious gravitational waves for an isolated, spinning BH. We demonstrate that we can evolve both a stationary and boosted BH stably and accurately with a spin parameter as high as a/M=0.99. Initial data for compact binaries containing rapidly spinning BHs may be constructed using our proposed metric for the background conformal metric. Our simulations for single BHs suggest that such binary initial data can be evolved successfully by the moving puncture technique.

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