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Inspiralling, spinning, non-precessing binary black hole spacetime via asymptotic matching BRENNAN IRELAND, Rochester Inst of Tech, BRUNO MUNDIM, Johann Wolfgang Goethe-Universitat, HIROYUKI NAKANO, Kyoto University, MANUELA CAMPANELLI, Rochester Inst of Tech — We construct and present a new global, fully analytic, approximate spacetime which accurately describes the dynamics of non-precessing, spinning black hole binaries during the inspiral phase of the relativistic merger process. This approximate solution of the vacuum Einstein's equations can be obtained by asymptotically matching perturbed Kerr solutions near the two black holes to a post-Newtonian metric valid far from the two black holes. This metric is then matched to a post-Minkowskian metric even farther out in the wave zone. The procedure of asymptotic matching is generalized to be valid on all spatial hypersurfaces, instead of a small group of initial hypersurfaces discussed in previous works. This metric is well suited for long term dynamical simulations of spinning black hole binary spacetimes prior to merger, such as studies of circumbinary gas accretion which requires hundreds of binary orbits.

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