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*Multidomain spectral methods for the helically reduced wave equation.* Preliminary report.

We present a multidomain spectral method for solving the scalar wave equation reduced via a helical Killing field, the so-called helically reduced wave equation (HRWE). The HRWE serves as the fundamental model for the mixed-type PDE arising in the periodic standing wave approximation to binary inspiral, and is reminiscent of other mixed-type equations appearing in transonic flow problems. Solution of the three-dimensional scalar HRWE is also the key component in numerical investigations of the helically symmetric post-Minkowski gravitational field. The relevant numerical domain is doubly punctured, with Dirichlet conditions at inner boundaries and radiation conditions at the outer boundary. This is ongoing and preliminary work. (Received January 15, 2008)