1154-35-1447 **Carley R Walker***, 118 College Drive, Hattiesburg, MS 39406. *Rapid Approximate Diagonalization of Variable-Coefficient Differential Operators using the Uncertainty Principle.* Preliminary report.

We propose to create a new numerical method for a class of time-dependent PDEs (second-order, one space dimension, periodic boundary conditions) that can be used to obtain more accurate and reliable solutions than traditional methods. Previously, it was shown that conventional time-stepping methods could be avoided for time-dependent mathematical models featuring a finite number of homogeneous materials, thus assuming general piecewise constant coefficients. This proposed method will avoid the modeling shortcuts that are traditionally taken, and it will generalize the piecewise constant case of energy diffusion and wave propagation to work for an infinite number of smaller pieces, or a smoothly varying coefficient. We hypothesize that by treating a smoothly varying function as a piecewise constant function with infinitely many pieces, this potential method can be realized. Through the Uncertainty Principle, we will expectedly formulate highly accurate eigenfunctions which will in turn help us produce a more efficient solution method that avoids traditional time-stepping. (Received September 15, 2019)