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Poincare recurrence and intermittent destruction of the Kelvin wave cascade in turbulence GEORGE VAHALA, William & Mary, JEFFREY YEPEZ, AFRL, Hanscon AFB, LINDA VAHALA, Old Dominion University, MIN SOE, Rogers State University, BO ZHANG, William & Mary, SEAN ZIEGELER, High Performance Technologies, Inc — Spacecraft data for solar wind turbulence shows a more sophisticated magnetic energy spectra than the simple $k^{-5/3}$ Kolmogorov spectrum of fluid turbulence. In particular data shows that while the low wave number magnetic energy spectrum follows the Kolmogorov $k^{-5/3}$ cascade, there is a clear break in the spectral exponent with the spectrum having a somewhat steeper power law decay at the kinetic ion scales. A unitary lattice algorithm, based on interleaved unitary collision-stream operators, is implemented to study turbulence of the nonlinear Schrodinger equation. Because of the near perfect parallelization of this unitary algorithm simulations were performed on 5760^3 grids, yielding multi-scale physics seen in the multi-cascade behavior of the incompressible kinetic energy. Very short Poincare recurrence times have been seen with the intermittent destruction of the Kelvin wave cascade.

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