1046-35-2065 **Ravi Srinivasan*** (rav@dam.brown.edu), Division of Applied Mathematics, Brown University, 182 George St., Providence, RI 02912. *Complete integrability in Burgers turbulence.* Preliminary report.

Decaying Burgers turbulence (1-D Burgers equation with random initial data) is a fundamental example of a nonlinear system out of equilibrium with wide applicability as a model of coarsening through particle coalescence. Shocks that generically develop due to the nonlinearity serve the role of particles that interact through ballistic aggregation as the system coarsens. More generally one can consider the initial value problem for the 1-D scalar conservation law

$$\partial_t u + \partial_x f(u) = 0$$
$$u(x,0) = u_0(x)$$

with $u_0(x)$ a stochastic process indexed by x (which can be interpreted a random field in one dimension). Previous work with the Burgers flux include results for u_0 a spectrally negative Levy process and a highly nontrivial explicit solution for Gaussian white noise initial data. Both of these can be regarded as limit cases with $u_0(x)$ a stationary, spectrally negative Markov process, for which we show the entropy solution $u(x,t)$ to the conservation law remains in this class. Furthermore, we demonstrate that the evolution of the infinitesimal generator of the solution process has the remarkably simple form of a Lax pair. (Received September 17, 2008)