1032-76-131 **Gregory L Eyink*** (eyink@ams.jhu.edu), Dept. of Applied Mathematics & Statistics, The Johns Hopkins University, 3400 N. Charles St., Baltimore, MD 21218. *Physical Mechanism of the 2D Inverse Energy Cascade: Progress and Problems.*

Although "inverse energy cascade" in 2D turbulence was proposed by Kraichnan (1967)forty years ago, it remains, seemingly, a controversial subject. We review some recent progress in identifying the physical mechanism of inverse cascade, which strengthens proposals of Kraichnan (1976), Rhines (1979), Salmon (1982) on "vortex thinning". According to this idea, inverse cascade is due to large-scale strain performing negative work against positive stress directed along isolines of small-scale vorticity. In addition to reviewing the theoretical and empirical evidence in favor of this mechanism, we discuss some outstanding problems, in particular, the role of self-interactions of small-scale vorticity and of the small-scale pressure-hessian in the relative rotation of strain matrices at neighboring length-scales. (Received August 19, 2007)