Global existence of two-dimensionl Navier-Stokes flow with nondecaying initial velocity

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A global-in-time unique smooth solution is constructed for the Cauchy problem of the Navier-Stokes equations in the plane when the initial velocity field is merely bounded and not necessarily square-integrable. The proof is based on a uniform bound for the vorticity which is only valid for planer flows. The uniform bound for the vorticity yields a coarse globally-in-time a priori estimate for the maximum norm of the velocity which is enough to extend a local solution.

This is joint work with Y. Giga and S. Matsui.