A Cheap Caffarelli-Kohn-Nirenberg inequality for the Navier-Stokes equations with hyper-dissipation

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This talk will be about joint work with Nets Katz on partial regularity results for the Navier-Stokes equations with hyper-dissipation. We prove that for the Navier Stokes equations with dissipation $(-\Delta)^\alpha$, where $1 < \alpha < \frac{5}{4}$, and smooth initial data, the Hausdorff dimension of the singular set at time of first blow up is at most $5 - 4\alpha$. We could think about this as about an interpolation between the result of Caffarelli-Kohn-Nirenberg in the case when $\alpha = 1$, and the fact that one has a global strong solvability in the case when $\alpha \geq \frac{5}{4}$. We prove the result by localization methods. In particular, we combine the theory of Littlewood-Paley operators with the theory of type $(1, 1 - \epsilon)$ pseudodifferential operators.