1077-35-1222 **Walter Craig*** (craig@math.mcmaster.ca), Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario L8S 4K1, Canada. *On the size of the Navier - Stokes singular set.*

Consider the hypothetical situation in which a weak solution $u(t,x)$ of the Navier-Stokes equations in three dimensions develops a singularity at some singular time $t = T$. It could do this by a failure of regularity, or more seriously, it could also fail to be continuous in the strong L^2 topology. The famous Caffarelli Kohn Nirenberg theorem on partial regularity gives an upper bound on the Hausdorff dimension of the singular set $S(T)$. We study microlocal properties of the Fourier transform of the solution in the cotangent bundle $T*(R^3)$ above this set. Our first result is that, if the singular set is nonempty, then there is a lower bound on the size of the wave front set $WF(u(T,.))$, namely, singularities can only occur on subsets of $T*(R^3)$ which are sufficiently large. Furthermore, if the solution is discontinuous in L^2 we identify a closed subset $S'(T) \subseteq S(T)$ on which the L^2 norm concentrates at this time T. We then give a lower bound on the microlocal manifestation of this L^2 concentration set, which is larger than the general one above. An element of the proof of these two bounds is a global estimate on weak solutions of the Navier-Stokes equations which have sufficiently smooth initial data. (Received September 18, 2011)