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Zhen Lei, School of Math, Fudan University, Shanghai, Peoples Rep of China, and **Qi S. Zhang*** (qizhang@math.ucr.edu), Math Dept. UC Riverside, Riverside, CA 92521. *The structure of solutions of axis symmetric Navier-Stokes equations near maximal points.*

Let $v = v(x, t)$ be a solution to the 3 d axis symmetric NS. Let (x_0, t_0) be a point such that the flow speed $|v(x_0, t_0)|$ is comparable to the maximum speed for time $t < t_0$. Suppose also $r_0|v(x_0, t_0)|$ is sufficiently large, where r_0 is the distance from x_0 to the z axis. Then v , after scaling around (x_0, t_0) , is close to a constant vector of norm 1 in $C^{2,1}$ norm in a space time neighborhood of fixed size.

The same conclusion also holds if the scaling invariant quantity $r_0|v(x_0, t_0)|$ is large and that it is comparable to its maximum of $r|v(x, t)|$ for $t < t_0$. (Received January 25, 2010)