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Jennifer Burke Loftus* (jenn@math.ucr.edu), University of California, Riverside, Math Dept./Surge Building 2nd Floor, Riverside, CA 92521. *Gaussian Upper Bound of a Parabolic Equation Arising in the study of the Navier-Stokes Equations*. Preliminary report.

We apply Moser's iteration to obtain an $L^2 - L^\infty$ estimate on solutions to the equation

$$\Delta\Gamma - b \cdot \nabla\Gamma - \frac{2}{r}\partial_r\Gamma - \partial_t\Gamma = 0, \text{ Div } b = 0.$$

We then obtain a weighted estimate which, in turn, provides a Gaussian upper bound on solutions. There is still a question as to if a lower bound can be obtained. The standard Nash Inequality will not suffice due to a necessary vanishing condition on smooth solutions, but perhaps a similar argument with a different weight will be fruitful. (Received September 15, 2009)