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Remarks on the conditionnal regularity of the 3D Navier-Stokes equation.

We give sufficient conditions for the regularity of Leray-Hopf weak solutions of the Navier-Stokes equation. We prove that if one of three conditions (i) \( \partial u / \partial x_3 \in L_t^{s_0} L_x^{r_0} \) where \( \frac{2}{s_0} + \frac{3}{r_0} \leq 2 \) and \( 9/4 \leq r_0 \leq 3 \), (ii) \( \nabla u_3 \in L_t^{s_1} L_x^{r_1} \) where \( \frac{2}{s_1} + \frac{3}{r_1} \leq \frac{11}{6} \) and \( 54/23 \leq r_0 \leq 18/5 \), or (iii) \( u_3 \in L_t^{s_0} L_x^{r_0} \) where \( \frac{2}{s_0} + \frac{3}{r_0} \leq \frac{5}{8} \) and \( 24/5 \leq r_0 \leq \infty \), then the solution is regular. These conditions improve earlier results on the conditionnal regularity of the Navier-Stokes equations. This is a joint work with I. Kukavica. (Received September 12, 2006)