Conditional regularity for p-parabolic systems with critical right hand side

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We prove an ε-regularity result for a wide class of parabolic systems

$$u_t - \mathrm{div}\big(|\nabla u|^{p-2}\nabla u\big) = B(u, \nabla u)$$

with the right hand side B growing like $|\nabla u|^p$. It is assumed that the solution $u(t, \cdot)$ is uniformly small in the space of functions of bounded mean oscillation. The crucial tool is provided by a sharp nonlinear version of the Gagliardo–Nirenberg inequality which has been used earlier in an elliptic context by T. Rivière and P. Strzelecki.