SOBOLEV REGULARITY FOR SOLUTION TO THE MONGE AMPÈRE EQUATION

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I will talk about $W^{2,1}$ regularity for strictly convex Aleksandrov solutions to the Monge Ampère equation

$$\det D^2 u = f$$

where f satisfies $\log f \in L^\infty$. Under the previous assumptions in the 90's Caffarelli was able to prove that $u \in C^{1,\alpha}$ and that $u \in W^{2,p}$ if $|f-1| \leq \varepsilon(p)$. His results however left open the question of Sobolev regularity of u in the general case in which f is just bounded away from 0 and infinity. In a joint work with A. Figalli we finally show that actually $|D^2 u| \log^k |D^2 u| \in L^1$ for every $k > 0$.