Regularity for some doubly nonlinear evolutionary equations in measure spaces

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We will consider the regularity question for the nonnegative weak solutions of certain doubly nonlinear parabolic equations falling into a very large and important class of equations, namely the class of degenerate and singular equations. These type of evolutionary equations appear in the modeling of turbulent filtration of non-Newtonian fluids through a porous media. We will consider the equation

$$\frac{\partial(u^q)}{\partial t} - \nabla \cdot (|\nabla u|^{p-2}\nabla u) = 0, \quad 0 < q < 1, \quad p > 2.$$

We will show that the nonnegative weak solutions are locally Hölder continuous in measure spaces assuming only the measure to be a doubling non-trivial Borel measure supporting a Poincaré inequality.