Very slow convergence to the Barenblatt profiles for the fast diffusion equation

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In my talk I will deal with the fast diffusion equation:

$$
\begin{aligned}
&u_\tau = \nabla \cdot (u^{m-1} \nabla u), && y \in \mathbb{R}^n,\ \tau \in (0,T),\\
&u(y,0) = u_0(y) \geq 0 && y \in \mathbb{R}^n,
\end{aligned} \tag{1}
$$

for $m \leq m_* = \frac{n-4}{n-2}$, $n > 2$ and $T > 0$. The constant m_* is a critical exponent of the problem. The behaviour of solutions is completely different in the critical and subcritical case. It is well-known, that solutions to Problem (1) extinct in finite time for initial data with sufficiently fast decay. Furthermore, self-similar solutions with extinction are known (Barenblatt profiles). We will show, that "arbitrarily slow" convergence to these profiles occurs for suitable initial data. Moreover, we show that the rates of convergence are different in the critical and noncritical case.