Asymptotic Symmetries for Conformal Scalar Curvature Equations with Singularity

We give conditions on a positive Hölder continuous function $K(x)$ such that every C^2 positive solution $u(x)$ of the conformal scalar curvature equation

$$\Delta u + K(x)u^{\frac{n+2}{n-2}} = 0$$

in a punctured neighborhood of the origin in $\mathbf{R}^n$ either has a removable singularity at the origin or satisfies

$$u(x) = u_0(|x|)(1 + O(|x|^\beta)) \qquad \text{as} \qquad |x| \to 0^+$$

for some positive singular solution $u_0(|x|)$ of

$$\Delta u_0 + K(0)u_0^{\frac{n+2}{n-2}} = 0 \qquad \text{in} \quad \mathbf{R}^n \setminus \{0\}$$

where $\beta \in (0, 1)$ is the Hölder exponent of K.