Min-Oo conjecture for fully nonlinear conformally invariant equations.

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We show rigidity results for super-solutions to fully nonlinear elliptic conformally invariant equations in subdomains of the standard n-sphere under suitable conditions on the boundary. This proves rigidity for compact connected locally conformally flat manifolds (M, g) with boundary such that the eigenvalues of the Schouten tensor satisfy a fully nonlinear elliptic inequality and whose boundary is isometric to a geodesic sphere $\partial D(r)$, $D(r)$ a geodesic ball of radius $r \in (0, \pi/2]$ in S^n, and totally umbilical with mean curvature bounded bellow by the mean curvature of this geodesic sphere. Under the above conditions, we prove that (M, g) must be isometric to the closed geodesic ball $D(r)$.