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Zhongshan An and **Lan-Hsuan Huang***, University of Connecticut, Department of Mathematics, 341 Mansfield Rd. Unit 1009, Storrs, CT 06269. *Existence of static vacuum extensions with prescribed Bartnik boundary data*. Preliminary report.

The study of static vacuum Riemannian metrics arises naturally in general relativity and differential geometry. A static vacuum metric produces a Ricci flat manifold with global symmetry, and it is also deeply related to scalar curvature deformation and gluing. The well-known Uniqueness Theorem of Static Black Holes says that an asymptotically flat, static vacuum metric with black hole boundary must belong to the Schwarzschild family. In contrast to that rigidity phenomenon, R. Bartnik conjectured that one can find an asymptotically flat, static vacuum metric with arbitrarily prescribed boundary data. I will discuss recent progress toward this conjecture. (Received August 17, 2021)