The boundary Harnack principle in fractal spaces

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Abstract. The boundary Harnack principle (BHP) states that the ratio of any two functions, which are positive and harmonic on a domain, is bounded near some part of the boundary where both functions vanish. A given domain may or may not have this property, depending on the geometry of its boundary and the underlying metric measure space. In this talk, I will consider a geometric (scale-invariant) BHP which has interesting applications such as two-sided bounds for the Dirichlet heat kernel. The geometric BHP was proved to hold on inner uniform domains in Euclidean space (Aikawa, Ancona) and in non-fractal Dirichlet spaces of Harnack-type (Gyrya, Saloff-Coste). Extending those works, I will present a scale-invariant BHP for inner uniform domains in metric measure Dirichlet spaces that satisfy volume doubling and weak sub-Gaussian heat kernel bounds. This result applies to fractal-type spaces, e.g. Sierpinski gasket.