1154-46-1712 **Shashank Sule*** (ssule20@amherst.edu), AC 1794, 16 Barrett Hill Dr., Keefe Campus Center, Amherst College, Amherst, MA 01002, and **Sreeram Venkat** (srvenkat@ncsu.edu) and **Tian Lan** (1155091994@link.cuhk.edu.hk). *Sobolev Orthogonal Polynomials on the Sierpinski Gasket.* Preliminary report.

Building on the theory of Legendre orthogonal polynomials on the Sierpinski Gasket (SG), we develop a theory of Sobolev orthogonal polynomials on SG. Initially, we define several notions of a Sobolev inner product on SG using powers of the canonical Laplacian. We use these inner products to find general recurrence relations connecting the Sobolev polynomials to the Legendre polynomials on SG. We then analyze the finer properties of the Sobelev inner product by presenting estimates for the L^2, L^∞ and H^m norms of the polynomials and studying their convergence properties with respect to the parameters in the H^m inner product. We also highlight the major differences and similarities between the polynomials on SG and those on $\mathbb{R}$ resulting from the properties of the self-similar measure and the Laplacian. Finally, we study the properties of zero sets of polynomials and develop fast computational tools to explore applications to quadrature and interpolation on SG. (Received September 16, 2019)