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Linan Chen* (linan.chen@mcgill.ca), 805 Sherbrooke Street West, Burnside 1005, Burnside Hall 1005, Montreal, Quebec H3A0B9, Canada. *On the Exceptional Sets of Gaussian Free Fields in Any Dimension.*

The geometry of log-correlated Gaussian free fields (GFFs) has been extensively studied. For example, for the 2D GFF on a bounded planar domain (associated with the Laplace operator with the Dirichlet boundary condition), Hu, Miller and Peres (2010) studied the thick points, which, heuristically speaking, are locations where the GFF becomes "exceptionally" large, and they further determined the Hausdorff dimension of the set consisting of thick points. In this talk, we will explain how the study of such exceptional behaviors can be extended to a more general class of Gaussian random fields, for which we will continue using the terminology "GFFs". In particular, we adopt a sphere averaging regularization to treat polynomial-correlated GFFs in any dimension, and carry out an analysis of the "thick point" set analogous to the one in the log-correlated setting. Furthermore, we propose a general framework to study certain exceptional behaviors for both log-correlated and polynomial-correlated GFFs. Besides reproducing the classical results on thick point sets, this framework gives rise to new kinds of exceptional sets, the study of which leads to new information on the random geometry of the GFF. (Received February 20, 2018)