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Dan Cheng* (dan.cheng@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, 1108 Memorial Circle, Lubbock, TX 79409, and **Armin Schwartzman** (armins@ucsd.edu), Division of Biostatistics, University of California San Diego, 9500 Gilman Dr., La Jolla, CA 92093. *Expected number and height distribution of critical points of smooth isotropic Gaussian random fields.*

We obtain formulae for the expected number and height distribution of critical points of smooth isotropic Gaussian random fields parameterized on Euclidean space or spheres of arbitrary dimension. The results hold in general in the sense that there are no restrictions on the covariance function of the field except for smoothness and isotropy. The results are based on a characterization of the distribution of the Hessian of the Gaussian field by means of the family of Gaussian orthogonally invariant (GOI) matrices, of which the Gaussian orthogonal ensemble (GOE) is a special case. The obtained formulae depend on the covariance function only through a single parameter (Euclidean space) or two parameters (spheres), and include the special boundary case of random Laplacian eigenfunctions. (Received September 12, 2017)