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Dan Cheng* (dcheng2@ncsu.edu), NCSU Statistics Department, 2311 Stinson Drive, Campus Box 8203, Raleigh, NC 27606, and **Armin Schwartzman**. *Multiple Testing of Local Maxima for Peak Detection*.

We propose a topological multiple testing scheme for signals over N -dimensional domains where the tests are performed only at the local maxima of the smoothed observed signals. Assuming unimodal true peaks with finite support and isotropic Gaussian noise, it is shown that the algorithm with Bonferroni or Benjamini-Hochberg correction provides asymptotic strong control of the family wise error rate and false discovery rate, and is power consistent, as the search space and the signal strength get large, where the search space may grow exponentially faster than the signal strength. Simulations show that error levels are maintained for non-asymptotic conditions, and that power is maximized when the smoothing kernel is close in shape and bandwidth to the signal peaks, akin to the matched filter theorem in signal processing. (Received February 03, 2014)