

1109-60-52

**Dan Cheng** ([cheng@stt.msu.edu](mailto:cheng@stt.msu.edu)), Department of Statistics, 2311 Stinson Drive, North Carolina State University, Raleigh, NC 27695-8203, and **Yimin Xiao\*** ([xiao@stt.msu.edu](mailto:xiao@stt.msu.edu)), Department of Statistics and Probability, 619 Red Cedar Road, Michigan State University, East Lansing, MI 48824. *Excursion Probability of Gaussian Random Fields on Sphere*. Preliminary report.

Let  $X = \{X(x) : x \in \mathbb{S}^N\}$  be a real-valued, centered Gaussian random field indexed on the  $N$ -dimensional unit sphere  $\mathbb{S}^N$ . Approximations to the excursion probability  $\mathbb{P}\{\sup_{x \in \mathbb{S}^N} X(x) \geq u\}$ , as  $u \rightarrow \infty$ , are obtained for two cases: (i)  $X$  is locally isotropic and its sample functions are non-smooth and; (ii)  $X$  is isotropic and its sample functions are twice differentiable. For case (i), the excursion probability can be studied by applying the results in Piterbarg (1996), Mikhaleva and Piterbarg (1997) and Chan and Lai (2006). It is shown that the asymptotics of  $\mathbb{P}\{\sup_{x \in \mathbb{S}^N} X(x) \geq u\}$  is similar to Pickands' approximation on the Euclidean space which involves Pickands' constant. For case (ii), we apply the expected Euler characteristic method to obtain a more precise approximation such that the error is super-exponentially small. (Received January 18, 2015)