

# 國立中山大學應用數學系 非線性分析及優化理論研究中心 學術演講

講者：Professor Ian W. McKeague  
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講題：Central limit theorems under special  
relativity

時間：2014/12/08（星期一）14：10～15：00

地點：理學院四樓理 SC 4011 室

茶會：15:00 於理 SC 4010 室（系辦公室）

## 摘要

The Maxwell-Boltzmann distribution describes the energy of large systems of particles that interact through elastic collision. Numerous relativistic extensions have been proposed, but they do not explain the observed lognormal tail-behavior of the flux distribution of various astrophysical sources, especially those that expand into an infinite surrounding space (e.g., cosmic rays, quasars, gamma ray bursts, and X-rays from black hole objects). Motivated by this question, extensions of some classical CLTs under the conditions of special relativity are developed. The results are related to general CLTs on locally compact Lie groups due to Wehn, Stroock and Varadhan, although no extra conditions are needed in our special case. In addition, the asymptotic distribution has an explicit form that is readily seen to exhibit lognormal tail behavior. The limiting distribution is also shown to arise as the stationary distribution of a certain type of relativistic Ornstein-Uhlenbeck process.

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