1056-35-1388 **Guillaume Bal** (gb2030@columbia.edu), Columbia University, S. W. Mudd Building, Room 206, 500 West 120th Street, New York, NY 10027, and **Wenjia Jing*** (wj2136@columbia.edu), Columbia University, S. W. Mudd Building, Room 200, 500 West 120th Street, New York, NY 10027. *Corrector analysis for homogenization of stationary linear transport equations in random media.*

We consider stationary linear transport equations with highly oscillating optical parameters modeled as stationary random processes of the form $k(\frac{x}{\epsilon}, \omega)$. It is known that as ϵ goes to zero, the solutions converge to that of the homogenized equation with optical parameters averaged. In this paper we analyze the corrector, i.e., difference between the solutions. We show that: Firstly, as a random variable at each point in the phase space, the rescaled corrector converges in distribution to a Gaussian random variable. Secondly, as a process and with a different scaling, the corrector converges in distribution and weakly to a Gaussian process, which admits explicit stochastic integral representation. The proper scaling depends on the decorrelation rates of the random media, and the second result is obtained with additional assumptions on the structures of the random media satisfied by standard processes like Gaussian process and Poisson point process.

This research is motivated by and finds application in the inverse transport theory, which in turn has applications in medical imaging, geophysical imaging, etc. (Received September 21, 2009)