深地科学论坛（第九十八讲）

地震背景噪声互相关函数中非直达波的稳相分析

Stationary phase analysis for scattered waves in ambient noise cross-correlation functions

报告人：Yunyue Elita Li 教授 （普渡大学）

时　间： 2025 年 12 月 15 日 10.00-11.00

地　点： 深地全重 411 会议室　腾讯会议：969-295-364

邀请人： 方金伟 副教授

从环境地震噪声中提取地球内部精细结构信息，是当前地震监测的前沿方向。尽管基于噪声互相关的方法已能稳定重建直达波场，但如何从中可靠提取散射波信息，仍是实现更高分辨率地球成像的关键挑战。

报告人简介：

Dr. Yunyue Elita Li is the Mary J. Elmore New Frontiers Professor in Data Science in the Department of Earth, Atmospheric, and Planetary Science at Purdue University. Before that, she was an assistant professor in the Department of Civil and Environmental Engineering at the National University of Singapore and a postdoc associate at MIT. She received her Ph.D. degree in Geophysics from Stanford University and her B.S. degree in Information and Computational Science from the China University of Petroleum, Beijing. She received the **2018 J. Clarence Karcher Award** and the **2025 Virgil Kauffman Gold Medal Award** from the Society of Exploration Geophysicists (SEG), the 2022 SEG South & East Asia Honorary Lecturer Award, and the 2022 Young Innovator Award for Land Transport Excellence from the Land Transport Authority of Singapore. She was elected as the **2025-2026 SEG Distinguished Instructor Short Course (DISC) lecturer**.

Website: http://sgpnus.org/

YouTube Channel: https://www.youtube.com/channel/UC0-95XLac_hQmvR5yMDJO6A

报告简介：

The ambient seismic monitoring community has grown exponentially in the past few decades using the basic mathematical operation of cross-correlation. While the transmission waves are often stably obtained in the cross-correlation functions (XCFs), the reconstruction of scattered waves have not enjoyed a similar success. In this talk, we will present analytical stationary phase solutions for ambient noise cross-correlations, with an explicit focus on scattered arrivals. Aided by numerical examples, we will demonstrate the mathematical and corresponding physical conditions for scattered wave reconstruction and highlight the sources of crosstalk artifacts. We show that the signal-to-noise (SNR) ratio for the scattered waves are significantly lower than that for the transmission waves. As a result, scattered wave often becomes indistinguishable from the source crosstalk and correlation effects. Nonetheless, once the source influence is eliminated, the stationary phase solutions for scattering waves provide solid basis for extracting reliable scattering information from the noise correlation functions for higher resolution imaging and monitoring.

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