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First measurement of geoneutrinos at JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO) is a 20-kton multipurpose liquid scintillator detector located at a depth of 650 meters in South China. Although its primary mission is the determination of the neutrino mass ordering, JUNO's unprecedented target mass and excellent energy resolution offer a unique opportunity to study geoneutrinos with high statistics.

Geoneutrinos, produced by the decay of ^{238}U , ^{232}Th , and ^{40}K (which cannot be detected by JUNO due to their low energy) within the Earth's interior, carry vital information about the planet's chemical composition and heat sources. Benefiting from the largest ever detection volume for geoneutrinos, JUNO is expected to detect several hundred events per year, significantly surpassing the cumulative statistics of previous experiments such as KamLAND and Borexino.

This talk highlights JUNO's first geoneutrino analysis using the latest experimental data. We present the measured geoneutrino rate and its implications for geoscience. By comparing our findings with leading geological models, we demonstrate JUNO's power to discriminate between different mantle compositions.

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