

平成 16 年 11 月 19 日

応用物理学会北海道支部
会員各位

応用物理学会北海道支部

講演会のお知らせ

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演題：Experiments in wave chaos

講師：Professor, John Scales 氏

(Department of Geophysics, Physical Acoustics Laboratory, Colorado School of Mines)

日時：平成 16 年 11 月 26 日 (金) 13:30 ~ 14:30

場所：北海道大学工学部物理工学系大会議室 (A1-17)

主催：応用物理学会北海道支部

講演の要旨

When it comes to the sensitive dependence on initial conditions, rays behave in a fundamentally different way than waves. Or we could say equivalently that classical particles behave in a fundamentally different way than quantum ones. Classical particles (or rays) are characterized by individual trajectories in phase space. In contrast waves, or quantum particles, are characterized by all possible paths connecting the endpoints of an experiment; this is most easily visualized as a Feynman path summation. When a wave hits a small scatterer, the wavefront quickly heals and downstream of the scatterer it may be hard to tell that anything has happened. Whereas if two slightly perturbed rays hit a scatterer, they may end up in completely different regions of phase space. This latter behavior conforms to our usual notion of chaos, whereas the stability of wave propagation has led some to entirely deny the possibility of wave chaos. In this

talk I will describe experiments in ultrasonic wave propagation in strongly scattering media. By using lasers to excite and detect waves we can perform the measurements without touching the samples, thereby faithfully recording the wavefield everywhere on the surface of the samples. We will see that at late times in multiple scattering wave experiments useful notions of chaos can be defined, and that in this chaotic regime, deterministic information about the underlying average system can nonetheless be extracted.

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