

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

Area: Microwave & Radio Frequency

Host: Associate Professor Qiu Cheng Wei

TOPIC	:	Infinite-Q Guided Modes Radiate in the Continuum
SPEAKER	:	Mr. Wei Heng Graduate Student, ECE Dept, NUS
DATE	:	Friday, 30 June 2023
TIME	:	10:00 AM to 10:30 AM
VENUE	:	Join Zoom Meeting: https://nus-sg.zoom.us/j/83621789176?pwd=L2hINVNtWHgvM2lFbkQxcEpONUQydz09 Meeting ID: 836 2178 9176 Passcode: 270459

ABSTRACT

Guided modes in photonic structures, with broadband infinite-quality factors, are inaccessible from the far field due to the momentum mismatch. They become leaky modes in the continuum when the mismatch is compensated for by introducing periodic perturbations to form photonic structures. However, the quality factors (Q factors) of such leaky modes deteriorate significantly in most regions of the k-space except at a few discrete high-symmetry points. It is an intriguing question as to whether guided modes can hop above the light cone and yet maintain high Q. Here, we propose a double-band-folding strategy to achieve high-Q leaky modes in compound lattices, exemplified with a one-dimensional grating and a two-dimensional zigzag array of dielectric disks. The Q factor of those leaky modes can be made ultrahigh at arbitrarily any incident angles, showing that such modes do not originate from bound states in the continuum (BICs) above the light cone. Our findings provide unique insight for elucidating the relations between guided modes, BICs, quasi-BICs, and radiation. They further provide a generalized recipe for numerous optical applications such as all-dielectric sensing, lasing, and nonlinear generation with multiple inputs.

BIOGRAPHY

Wei Heng received his Bachelor's degree from The Hong Kong Polytechnic University in 2015 and his Master's degree from UCLA in 2020. He is currently a Ph.D. student in Prof. Qiu Cheng Wei's group in School of Electrical and Computer Engineering at NUS. His research interests include photonic crystals, bound states in the continuum, exceptional points, and topological photonics.

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