

Abstract Submitted
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**Folded chaotic whispering-gallery modes
in non-convex, waveguide-coupled planar optical microresonators** KAHLI

BURKE, JENS NOECKEL, University of Oregon — Chaotic whispering-gallery modes have significance both for optical applications and for our understanding of the interplay between wave phenomena and the classical ray limit in the presence of chaotic dynamics and openness. However, the ray patterns corresponding to such modes only exist in convex cavities [1]. We performed numerical computations of the electromagnetic fields in planar dielectric cavities that are strongly non-convex because they are coupled to waveguides, and found a family of special states which retains many features of the chaotic whispering-gallery modes [2]: an intensity pattern corresponding to near-grazing incidence along extended parts of the boundary, and comparatively high cavity Q factors. The modes are folded into a figure-eight pattern, so overlap with the boundary is reduced in the region of self-intersection. The modes combine the phenomenology of chaotic WGMs with an important technological advantage: the ability to directly attach waveguides without spoiling the Q factor of the folded mode.

[1] J. N. Mather, *Ergodic Theory and Dynamical Systems* 4, 301 (1984). [2] K. Burke and J.U.Noeckel, *Phys. Rev. A*, 063829 (2019)

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