



**THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY**

**Department of Mathematics**

**SEMINAR ON PDE**

**A Schiffer-type problem with applications to stationary Euler flows**

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**Abstract**

If on a smooth bounded domain  $\Omega \subset \mathbb{R}^2$  there is a nonconstant Neumann eigenfunction  $u$  that is locally constant on the boundary, must  $\Omega$  be a disk or an annulus? This question can be understood as a weaker analog of the well-known Schiffer conjecture, in that the function  $u$  is here allowed to take a different constant value on each connected component of  $\partial\Omega$  yet many of the known rigidity properties of the original problem are essentially preserved. In this talk we provide a negative answer by constructing a family of nontrivial doubly connected domains  $\Omega$  with the above property. Then, we will show how our construction implies the existence of continuous, compactly supported stationary weak solutions to the 2D incompressible Euler equations which are not locally radial. The talk is based on a joint work with Alberto Enciso, David Ruiz and Pieralberto Sicbaldi.

**Date: 29 February 2024 (Thursday)**

**Time: 4:00pm**

**Zoom Meeting: <https://hkust.zoom.us/j/97508764296> (Passcode: 583722)**

*All are Welcome!*