



# Lothar-Collatz-Kolloquium für Angewandte Mathematik

**Donnerstag, den 02. Februar 2023, um 17:15 Uhr, im Hörsaal 5**

**Prof. Dr. David Henry\***

(University College Cork, Ireland, School of Mathematical Sciences)

## ***"Energy considerations for nonlinear water waves in the Equatorial f-plane"***

### **Zusammenfassung/Abstract:**

This talk presents recent results concerning excess energy densities for exact nonlinear water waves. The theory underlying ocean wave energy suffers from the fundamental limitation that most of the state-of-the-art is strongly contingent on invoking linear approximations. In this talk we consider the excess kinetic and potential energies for exact nonlinear equatorial water waves in the f-plane. An investigation of linear waves establishes that the excess kinetic energy density is always negative, whereas the excess potential energy density is always positive, for periodic travelling irrotational water waves in the steady reference frame. For negative wavespeeds, we prove that similar inequalities must also hold for nonlinear wave solutions. Characterisations of the various excess energy densities as integrals along the wave surface profile are also derived.

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