

Invisible catastrophes: when to turn an asymptotic blind eye**07.02****Christopher J. Howls***(University of Southampton, UK)***Time:** Monday 22.07., 11:00 - 11:30, Room HS 5

Abstract: Recent work on high-frequency flow-interaction effects for 3D jet engine noise in a moving media uncovered unusual structures that appeared to violate mathematical aspects of both classical ray analysis and catastrophe theory whereby caustics appeared to end at finite ordinary (as opposed to turning) points in real space. A careful study of the local (complex) ray structure led to the introduction of a novel set of special functions that, a posteriori, resolved these problems. These special functions possess interesting novel properties from the point of view of analysis, with implications for exponential asymptotics. These special functions are now seen to occur in a variety of physical situations, ranging from the original aeroacoustic problem, to black hole event horizons and nonlinear traveling waves such as the Severn Bore. In this talk we will introduce these special functions and give an introduction to their novel properties.