

From asymptotics to exact results: unraveling the analytic structure of solutions of Painlevé I**07.01** **Inês Aniceto***(University of Southampton, UK)***Time:** Monday 22.07., 10:30 - 11:00, Room HS 5

Abstract: Understanding the asymptotic properties of solutions of the Painlevé I non-linear ODE is of great interest in both mathematics and physics. It is well known that the asymptotic behaviour of these solutions is connected to the existence of exponentially small contributions, directly linked to physical phenomena not captured by a perturbative analysis. The theory of resurgence perfectly captures this perturbative/non-perturbative connection and its consequences. Moreover, it allows us to construct a full non-perturbative solution from perturbative data. In this talk, I will demonstrate the essential role of resurgence theory, coupled to exponentially accurate numerical methods, in going beyond the perturbative results and obtain (analytically and numerically) non-perturbative data. In particular, I will exemplify how these techniques can be applied to the calculation of poles of Painlevé I solutions.