Helicalised fractals, curved wormholes, time travel, rotating black hole

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Date: 15 October 2020 (Thursday)
Time: 5.30pm – 6.30pm
Venue: MAS Executive Classroom 1 (SPMS-MAS-03-06)
Host: Dr Koh Teck Seng

Abstract

In a class project for PAP352 (PH3502) to create a cool fractal image, I asked the question: “Given a smooth curve, replace it by another curve that winds around it. After this is done, the resulting curve is replaced by yet another one that winds around it, and so on. What will the ultimate curve be?” Well, this has led us to the formulation of helicalised fractals. Alternatively, if one replaces a given curve by a continuous string of circles, then one obtains a surface of revolution around the curve. A raft of applications of this method has been carried out in General Relativity, viz. designing “safe” curved traversable wormholes, constructing new (linearised) vacuum spacetimes allowing for time travel, as well as reproducing the spacetime for a slowly rotating black hole in a geometric way.

Short Biography

Dr Saw Vee-Liem is a mathematical physicist who worked on Albert Einstein’s Theory of General Relativity. His PhD dissertation is related to two Nobel Prizes in Physics (2017 and 2011). After that, he returned to NTU as a Postdoctoral Research Fellow, switching into working on real-world urban complexity problems, like our NTU “bus bunching conundrum”.

Dr Saw had received three consecutive Teaching Assistant Awards in NTU, as well as several Honorary Mentions for his research talks in many international conferences. Most notably, he earned the coveted “Karl Schwarzschild Prize 2017” for the best overall talk in Frankfurt, Germany, named after the physicist who first solved Einstein’s theory to discover black holes. Last year, he was first runner-up at the NTU Three-Minute Thesis in the inaugural postdoctoral category.

***Registration will close on 15 Oct, 10am. Attendance is limited to a maximum of 18 people.
Seminar Registration: https://doodle.com/poll/952whp6bxbpbdhra

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