

# Non-singular Kerr-NUT-(anti-)de Sitter spacetimes with projectively non-singular horizons

*Thursday, 24 September 2020 12:10 (15 minutes)*

Spacetimes with NUT parameter are known to possess a string-like conical singularity. We present a method for obtaining non-singular Kerr-NUT spacetimes with an arbitrary cosmological constant, via an analogue of the Misner interpretation of Taub-NUT spacetimes. Among the non-singular solutions there is a class for which also one of the horizons is projectively non-singular, i.e. its space of null generators is non-singular. The horizon is found to be always a cosmological one (but possibly with a negative mass) and non-extremal. The topology of such non-singular horizon is of a non-trivial bundle of  $U(1)$  over  $S^2$  and can be extended onto the spacetime in such a way that the global topology is  $S^3 \times \mathbb{R}$ . We provide a geometric interpretation of the non-singular structures on the spacetime, our approach relies on the space of orbits of the Killing vector field of a particular Killing vector field.

**Primary author:** OSSOWSKI, Maciej (University of Warsaw)

**Co-author:** Prof. LEWANDOWSKI, Jerzy (University of Warsaw)

**Presenter:** OSSOWSKI, Maciej (University of Warsaw)

**Session Classification:** Mathematical and Numerical Relativity