

## SEMPARIS – Séminaires en région parisienne

<http://string.lpthe.jussieu.fr/semparis/>

### Séminaire du GReCO : groupe de GRavitation et COsmologie à l'IAP

**Lundi 2 Novembre 2020, 11 :00**

IAP, zoom details : contact [pitrou@iap.fr](mailto:pitrou@iap.fr)

Domaines : gr-qc

Titre : *Disforming the Kerr metric*

Orateur : **Timothy Anson ( LPT Orsay )**

Résumé : *Starting from a recently constructed stealth Kerr solution of higher order scalar tensor theory involving scalar hair, we analytically construct disformal versions of the Kerr spacetime with a constant degree of disformality and a regular scalar field. While the disformed metric has only a ring singularity and asymptotically is quite similar to Kerr, it is found to be neither Ricci flat nor circular. Non-circularity has far reaching consequences on the structure of the solution. As we approach the rotating compact object from asymptotic infinity we find a static limit ergosurface similar to the Kerr spacetime with an enclosed ergoregion. However, the stationary limit of infalling observers is found to be a timelike hypersurface. A candidate event horizon is found in the interior of this stationary limit surface. It is a null hypersurface generated by a null congruence of light rays which are no longer Killing vectors. Under a mild regularity assumption, we find that the candidate surface is indeed an event horizon and the disformed Kerr metric is therefore a black hole quite distinct from the Kerr solution.*

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