Contribution ID: **44** Type: **not specified**

Self-excited gravitational instantons

Wednesday 2 October 2024 11:45 (45 minutes)

The finite Euclidean action solutions known as instantons play an important role in non-perturbative understanding of Yang-Mills theory. In this talk, I will introduce a novel approach to constructing gravitational instantons using the teleparallel formulation of general relativity, which has an interesting feature of expressing the action of general relativity as an exterior product of the torsion and excitation forms. This allows us to define a new class of self-excited solutions, where these two forms are equal. These solutions closely resemble the BPST instantons in Yang-Mills theory, as their action reduces to a topological Nieh-Yan term, with axial torsion taking the role of the Chern-Simons current, allowing us to define a gravitational analogue of the winding number.

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