



Contribution ID: 98

Type: not specified

On the Lagrangian formulation of the double copy to cubic order

Tuesday 15 December 2020 12:05 (5 minutes)

We investigate the Lagrangian formulation of the double-copy correspondence between gauge theories and gravity, up to the cubic order. Building on the definition of the double-copy field as a convolution of two vectors, we obtain free gravitational Lagrangians as products of two Yang-Mills Lagrangians, in a form amenable to be easily extended to the massive case. We discuss the origin of these results from tensionless strings and show the existence of gauge fixings that mix the two spin-one sectors and lead to an alternative, especially simple, version of the free Lagrangian. We then construct cubic vertices for the full double-copy multiplet, comprising a graviton, a two-form and a scalar particle, by means of the Noether procedure. Both at the free and at the cubic level the result gets uniquely fixed only upon imposing, on top of gauge invariance, a left-right Lorentz symmetry ruling contraction of indices among double-copy fields. Whereas the outcome nicely matches the cubic interactions of $N = 0$ supergravity, including the gauge-invariant coupling between the scalar particle and the two-form, such a twofold Lorentz symmetry seems to conflict with the perturbative reconstruction of space-time geometry.

Would you be interested in receiving feedback on your talk?

Yes

Will you be pre-recording your talk?

No

Length of talk

3-5 minutes

Are you happy for your talk to be recorded?

No

Author: FERRERO, Pietro (University of Oxford)**Co-author:** FRANCIA, Dario**Presenter:** FERRERO, Pietro (University of Oxford)**Session Classification:** 5 Minute Talks