
Contribution ID: **146** Type: **not specified**

# Reconstruction of UV graviton amplitude from IR singularities

*Tuesday 26 July 2022 11:00 (18 minutes)*

Scattering amplitudes mediated by graviton exchange display IR singularities in the forward limit. This obstructs standard application of positivity bounds based on twice subtracted dispersion relations. Such divergences can be cancelled only if the UV limit of the scattering amplitude behaves in a specific way, which implies a very non-trivial connection between the UV and IR behaviors of the amplitude. We show that this relation can be expressed in terms of an integral transform, obtaining analytic results when $t \log s \to 0$. Carefully applying this limit to dispersion relations, we find that infinite arc integrals, which are usually taken to vanish, can give a non-trivial contribution in the presence of gravity, unlike in the case of finite negative t. This implies that gravitational positivity bounds cannot be trusted unless the size of this contribution is estimated in some way, which implies assumptions on the UV completion of gravitational interactions. We discuss the relevance of these findings in the particular case of QED coupled to gravity.

**Author:** TOKAREVA, Anna (Imperial College London)

**Presenter:** TOKAREVA, Anna (Imperial College London)

**Session Classification:** Parallel Session C

**Track Classification:** Strings