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String theory on time-dependent backgrounds: a Big-Bang type singularity

The study of cosmological singularities in the context of string theory has been widely addressed on different time-dependent spacetime backgrounds and has never proved completely successful. Here we investigate the Null Boost Orbifold, which reproduces a Big-Bang type singularity but unfortunately suffers from unusual divergences when dealing with scattering amplitudes both in the closed and open string sector. We trace back the origin of this pathological behaviour to the non-existence of a well-defined perturbative expansion into ordinary Feynman diagrams of the underlying effective QFT. Then we show that the introduction of a background Kalb-Ramond B-field, with the help of the well-known Seiberg-Witten map, may be the key towards the resolution of the singularity.

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