Title: Born-Infeld gravity and cosmological singularities

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In 2010, Banados and Ferreira (BF) constructed a variant of Born-Infeld (BI) gravity with a simple matter coupling and demonstrated how the standard background FRW cosmology could become free of curvature singularities (big-bang). Further investigations revealed many interesting consequences of this BF version of BI gravity. Beginning with a toy 3D version, we first show some simple analytical solutions exhibiting the removal of singularities. Thereafter, we look at BI gravity coupled to scalar BI matter where we are able to find non-singular (loitering and bounce types) background solutions with late as well as early time acceleration. Finally, we elevate the BI gravity parameter to a space-time dependent field (in a novel Brans-Dicke like way) and demonstrate how cosmologies without singularities and with late as well as early-time acceleration can indeed arise quite naturally.

References:

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2. S. Jana and S. Kar, Phys. Rev. **D 96**, 024050 (2017).