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Thraxions: Ultralight Throat Axions

Thursday 27 June 2019 17:00 (15 minutes)

We argue that a new type of extremely light axion is generically present in the type IIB part of the string theory landscape. Its mass is suppressed by the third power of the warp factor of a strongly warped region (Klebanov-Strassler throat), suggesting the name thraxion. Our observation is based on the generic presence of several throats sharing the same 2-cycle. This cycle shrinks to zero volume at the end of each throat. It is hence trivial in homology and the corresponding C2 axion is massive. However, the mass is warping-suppressed since, if one were to cut off the strongly warped regions, a proper 2-cycle would re-emerge. Since the kinetic term of the axion is dominated in the UV, an even stronger, quadratic mass suppression results. Moreover, if the axion is excited, the angular modes of the throats backreact. This gives our effective C2 axion a finite monodromy and flattens its potential even further. Eventually, the mass turns out to scale as the third power of the warp factor.

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