



Contribution ID: 64

Type: **not specified**

Consequences of Fine-Tuning for Fifth-Force Searches

Tuesday 5 June 2018 15:40 (20 minutes)

A light bosonic field mediates a long-range “fifth” force between objects. If the field has self-interactions, experimental constraints on such forces are weakened due to a screening effect. We study how technically natural values for self-interaction terms in the field’s potential lead to modification of existing constraints. We show that under this assumption of natural self-interactions, existing experimental coverage has important gaps, particularly for forces stronger than gravity.

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Session Classification: Parallel 2