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There are a number of models that aim to reconcile the observed accelerating expansion of the universe with our current understanding of general relativity. One interesting model proposes the existence of a scalar field that is screened in regions of high matter density and can therefore go unnoticed in experiments performed on Earth –colloquially referred to as the 'chameleon field'.

In 2015 Burrage et al showed that atoms inside a vacuum chamber are too small to screen the chameleon field and could therefore be used as a probe to measure it. Since then a number of experimental searches have been undertaken using cold atoms, but have so far failed to observe its existence.

Here, we describe a number of upgrades to our experiment at Imperial College that improve our precision and reduce systematic sources of errors. We are now planning a series of experiments that will probe the remaining region in parameter space where a signature of the elusive chameleon field may exist.

Poster Abstract

Session Classification: Poster Session

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