



Contribution ID: 458

Type: Oral Presentation

## Chameleon Cosmology Near and Far

*Tuesday, 8 July 2014 16:10 (1 hour)*

**Abstract content**   
 (Max 300 words)   
 [Formatting & Special chars](http://events.saip.org.za/getFile.py/a/target=_blank)

In this talk we will consider a novel explanation of the dark energy problem, so called chameleon gravity which gives rise to particles with unexpected consequences. These particles discovered in 2003 by Khoury and Weltman are called Chameleon scalar fields and are dark energy candidates which, unlike regular quintessence fields, suppress their expected fifth force signals in high density regions of the universe by acquiring large effective masses. In regions of relatively low energy density these fields are very light and can essentially be free allowing for a plethora of interesting observations and effects. Perhaps most enticing is the possibility to observe these fields in experiments entirely non-cosmological in nature. These tests span from tests of gravity in space to tests of the casimir effect and quantum laser experiments on earth. In this talk we will discuss the various tests of these fields including those already completed and those currently under proposal and construction. We will also consider the possibility of testing these fields within the South African context using the SKA experiment. Chameleon gravity is one of only 3 ways known to hide the effects of scalar dark energy fields from local experiments and provide a possible window of testability connecting UV physics to IR experiments. We will discuss our results to date and explore the possibilities for the future.

**Apply to be considered for a student award (Yes / No)?**

No

**Level for award (Hons, MSc, PhD)?**

N/A

**Would you like to submit a short paper for the Conference Proceedings (Yes / No)?**

Yes

**Primary author:** Dr WELTMAN, Amanda (UCT)

**Presenter:** Dr WELTMAN, Amanda (UCT)

**Session Classification:** Plenary

**Track Classification:** Track H - Plenaries