

## Detecting dark energy using X-ray telescope

Chameleon dark energy models are a popular alternative to the standard cosmological constant model. These models consist of a new light degree of freedom, called chameleon, with a density dependent mass and a non-trivial coupling to both matter and photons. Owing to these couplings, chameleons can be produced inside the sun. However due to their density dependent mass, the chameleons produced in the solar core are screened whereas those produced outside the solar core can escape from the sun. In this work we show that chameleons can be abundantly produced in the solar tachocline and they can escape the sun resulting in a solar chameleon flux. Furthermore in order to detect these chameleons, we propose a *light shining through wall* (LSW) type of experiment in which the Earth acts as a wall stopping all the photons while allowing a fraction of the chameleons to pass directly through the Earth and exit from the night side. Here these chameleons interact with the geomagnetic field and convert into X-ray photons. A space based X-ray telescope orbiting the Earth can detect these X-ray photons, while passing through the night side, thereby acting as a detector in this LSW type experiment. We show that such a kind of setup can be complementary to other terrestrial experiments looking for chameleons.

### Track type

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