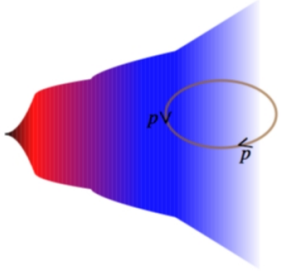
Presentazione: Alberto Salvio



From the electroweak scale to the Planck scale
and beyond

21^{th} of December 2018

A summary of the curriculum vitae

Education

- Master in physics at Rome University "La Sapienza"
- Doctor philosophiae in elementary particle theory at SISSA (Trieste)

Previous work experience

- Postdoc at EPFL (Lausanne), IFAE (Barcelona), Scuola Normale di Pisa
- research and teaching associate at IFT and Universitad Autónoma (Madrid)
- Fellow at CERN

Now

University researcher (RTDb) at Rome University & INFN "Tor Vergata"
... and (until June 2019) visiting scientist at CERN.

Previous research experience

(Focusing on that most relevant for ongoing personal activities)

- Tests of the Standard Model of elementary particles (SM) at ultrahigh energies

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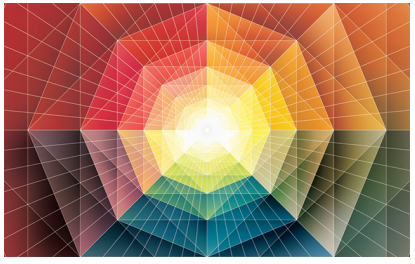

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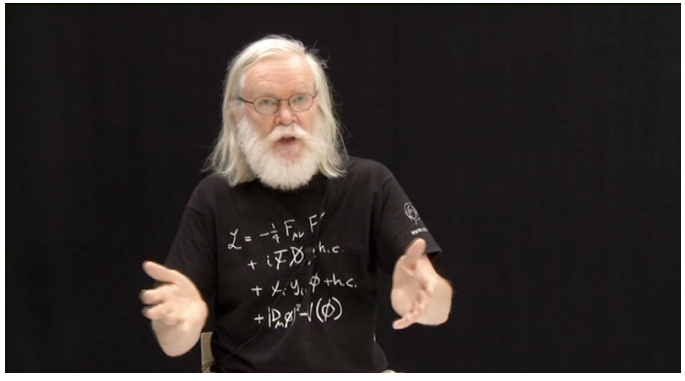

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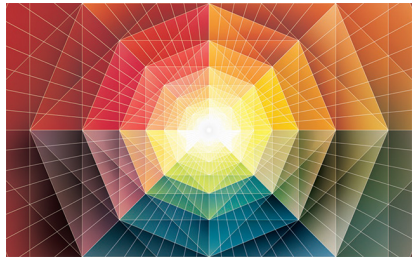

Other previous experience

(less relevant for ongoing personal activities)
AdS/CFT, Lorentz (a)symmetry in QFT

Current research lines

Bottom-up road: models

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I developed a model (SM+right-handed neutrinos + axion) [PLB (2015)] which can give

- dark matter (through axions and possibly the lightest right-handed neutrino)
- realistic neutrino oscillations (see-saw)
- a solution of the strong-CP problem (Peccei-Quinn symmetry)
- baryogenesis through leptogenesis (and its low-scale variants)
- inflation (through the Higgs or the extra scalar [Ballesteros et al, 2017])

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Given these advantages I plan to

I Study reheating in this model

II Address the hierarchy problem. This would lead to extra states (a scalar and a new quark) that can be visible at the LHC or future colliders.

Top-down road: theories

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The renormalizable extension of Einstein gravity (quadratic gravity)

1) has a classical Hamiltonian unbounded from below
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It has been shown that this problem is not a no-go theorem:

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So I plan to

I Study the predictions for the inflationary observable: e.g. a new isucurvature mode is predicted, but r is suppressed.

II New states are predicted at the scales of the LHC and future colliders (test it!). Explain the hints of new physics through the extra fields needed to "save" the SM.

Thank you very much for your attention!