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Axion predictions in GUT

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Non-supersymmetric Grand Unified $SO(10) \times U(1)_{\rm PQ}$ models have all the ingredients to solve several fundamental

problems of particle physics and cosmology – neutrino masses and mixing, baryogenesis, the non-observation of strong CP violation, dark matter, inflation – in one stroke. The axion - the pseudo Nambu-Goldstone boson arising from the

spontaneous breaking of the $U(1)_{PQ}$ Peccei-Quinn symmetry - is the prime dark matter candidate in this setup.

In this talk I will present how the axion mass can be determined in terms of the relevant gauge symmetry breaking scales in various $SO(10) \times U(1)_{PQ}$ models and which constraints can be placed on these models from the requirement of gauge coupling unification. Finally I will present the steps we have taken in order towards an anlysis of the stability of the electroweak vacuum in our model.

Primary authors: RINGWALD, Andreas (DESY); ERNST, Anne (Desy); Dr TAMARIT, Carlos (TUM)

Presenter: ERNST, Anne (Desy)

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