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<b>Thesis Title</b>	<i>Scalar QED</i>
<b>Supervisor</b>	A. Lahanas, Professor
<b>Summary</b>	<p>Landau Poles, Triviality bounds in the mass of scalar fields</p> <p>In this thesis we studied the scalar QED theory and our focal point was the derivation of mass bounds for the scalar field of our theory. In particular, in the initial part of this thesis we carried out the renormalization of the fields and couplings of the theory using dimensional regularization for the computation of the counter-terms. We then derived the <math>\beta</math>-functions (RGE's) of our theory. The Landau poles of these functions allowed us, at first, to determine the energy limit up to which our results and analysis are valid. After that we studied the spontaneous symmetry breaking of scalar QED and derived an analytical connection between the energy limit of the theory (Landau pole) and the bounds on the mass of the scalar field (Higgs mass). Lastly, we presented a comparison between the scalar QED theory and the typical scalar <math>\lambda\Phi^4</math>- theory, in order to conclude if and how our results are affected by the introduction of the gauge coupling, <math>e</math>, alongside the quartic coupling <math>\lambda</math>.</p>
<b>Key words</b>	Landau poles, Higgs mass
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