Infrared aspects of a model of QFT on a static space time

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We consider the Nelson model with variable coefficients, which can be seen as a model describing a particle interacting with a scalar field on a static space time. We consider the problem of the existence of the ground state, showing that it depends on the decay rate of the coefficients at infinity. We also show that it is possible to remove the ultraviolet cutoff, as it is in the flat case (joint work with C.Grard, F.Hiroshima, A.Suzuki)