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New upper limit for collapse models reduction rate parameter

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Our work is concerned with the investigation of the spontaneous emission, form orbital electrons and nuclear protons in Germanium atoms. The spontaneous emission of free electrons was first predicted and quantified by Q. Fu, as a consequence of electrons interaction with the stochastic field introduced in the non-relativistic Continuous Spontaneous Localization models.

An innovative Bayesian analysis was performed, consisting in the fit of the X rays emission spectrum from Germanium atoms, published by the low activity IGEX experiment. A new upper limit was obtained for the mean collapse frequency of the Dynamical Reduction Models: λ min $2.5 10 - 18 s - 1$ improving the preceding limit of a factor 20.

The expected emission rate formula was generalized in order to include the contribution of nuclear protons. According to the improved calculation an upper limit: λ min $8.1 10 - 20 s - 1$ was obtained for the collapse frequency parameter.

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