



Poster session 4 – Friday 8 July

P4.007 Search for dark photons using data from CRESST-II phase 2

A Gütlein

Institute for High Energy Physics, Austria

on behalf of CRESST collaboration

Hints for the existence of dark matter can be found on several length and time scales in the universe. However, the nature and origin of dark matter remains still unknown. Solving this dark-matter puzzle is one of the major challenges of modern particle physics.

Direct dark matter searches aim at an observation of dark-matter particles interacting with the detector material. Like several other experiments, CRESST-II focuses on dark-matter models predicting interactions with nuclei. For such models, the dominating β/γ backgrounds can be efficiently suppressed by our detectors. However, there is also a variety of dark-matter models favoring interactions with electrons rather than nuclei. In this work we will focus on so-called dark photons, i.e., light vector particles with a kinetic mixing to photons from the standard model. Via the kinetic mixing to standard-model photons, dark photons would interact with the electrons of the detector material. The signature of dark photons in our detectors would be a peak at the dark-photon mass. Thus, it is not possible to suppress β/γ backgrounds which also interact with electrons.

We present our result of a peak search for dark photons using the data obtained in phase 2 of CRESST-II. Using a semi-empirical model for β/γ backgrounds we can set the strongest limit on the kinetic mixing for dark-photon masses between our detection threshold of $300 \text{ eV}/c^2$ and $600 \text{ eV}/c^2$. In addition, we also show the projected sensitivities for the future CRESST-III experiment, where data taking for phase 1 starts in spring 2016.