

CASCADE –RF cavity experiment to search for hidden sector photons

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String-theory based extensions of the Standard Model (SM) introduce a set of new particles and fields. The only renormalizable interaction with the visible SM can occur via kinetic mixing of SM photon with the hidden sector photon (HSP).

These photon oscillations can be studied with “light shining through wall” type of experiments. One of these experiments is being built by the CASCADE (CAvity Search for Coupling of A Dark sEctor) collaboration. CASCADE experiment consists of two RF cavities that are isolated from each other and shielded from external RF sources. When power is fed into the first cavity, a proportion of the photons will mix into HSPs and propagate to the second cavity, and mix back to SM photons with an identical frequency to the original photons.

We will present the first measurement setup utilizing two 1.3 GHz copper cavities at liquid nitrogen temperatures. We will also discuss the anticipated physics reach and future upgrades to the measurement setup.

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