

Search for Dark Neutrino via Vacuum Magnetic Birefringence Experiment

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We consider a dark matter model where a dark matter candidate couples to photons via an extra U(1) mediator and

assume that this dark matter candidate is a fermion and can couple to the mediator with parity violation.

We derived a low energy effective Lagrangian including a parity violated term for light-by-light scattering by integrating out the dark matter fermion.

Our focus lies on Vacuum Magnetic Birefringence Experiment to probe the dark sector.

We propose the ring resonator (3-4 mirrors) with an appropriate polarization state of light in stead of a usual Fabry-Perot resonator (2 mirrors) with a conventional polarization state of light to measure the Parity violated term. We assume that a dark neutrino is a dark matter, i.e. V-A current, and give constraints on model parameters from a current experimental limit.

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Presenter: YAMASHITA, Kimiko (Ochanomizu University)

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