

SEARCH FOR A LEPTOPHOBIC GAUGE BOSON VIA H DECAY AT JLAB

Prof Liping Gan¹

¹University of North Carolina Wilmington

A leptophobic V_B -boson couples predominantly to quarks and arises from a new U(1) baryon number gauge symmetry. Its leading decay is $V_B \rightarrow \gamma \pi^0$ for the mass range of 140-620 MeV. This offers a great experimental opportunity to search for such weakly-coupled gauge boson in the sub-GeV mass range through η doubly-radiative decay $\eta \rightarrow \gamma V_B \rightarrow \gamma \gamma \pi^0$. The JLab Eta Factory (JEF) experiment has been recently developed to search for V_B through this decay channel, with sensitivity to the baryonic fine structure constant as low as 10^{-7} , indirectly constraining the existence of anomaly cancelling fermions at the TeV-scale. Proposed experiment to search for V_B in three-photon final states ($V_B \rightarrow \gamma \pi^0 \rightarrow 3\gamma$) is complementary to other accelerator-based searches for invisible decays; it is also complementary to ongoing worldwide effort for a dark photon A' focusing mainly on the signatures involving leptons.

Acknowledgment: This work is supported by US NSF award PHY-1506303.