Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, March 2-nd, 2010

(16:00 in Room 459/30b)

Attacking Dark Forces with Intense Electron Beams at DESY

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Abstract

Theoretical models related to dark matter have suggested that there are long–range forces mediated by new gauge bosons with masses in the MeV to GeV range and very weak coupling to ordinary matter ("dark or hidden photons"). Moreover, such new gauge bosons appear naturally in supersymmetric models decending from string theory. The current experimental constraints on the existence of these new gauge bosons are quite weak, but the experimental high energy physics community is now starting to develop strategies and to form collaborations to attack these dark forces in new experiments at low energy, but high intensity accelerators. In particular, it has been realized that fixed–target experiments are ideally suited to discover new $\mathbf{U(1)}$ gauge bosons (with an expected mass in the range MeV—GeV) through their kinetic mixing with the photon. Such new experiments might be realized not only at Jefferson Lab in the US, but also at ELSA in Bonn, MAMI in Mainz, or at DESY in Hamburg. A first beam dump experiment, *DarkDESY*, is presently assembled at DESY–II. Parasitic use of the FLASH–II electron beam would offer exciting new possibilities.

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