

Searches for a light Higgs and dark photons at BABAR

Monday, 3 December 2012 15:00 (30 minutes)

Babar collided electrons and positrons at a centre of mass energy of $\sim 10\text{GeV}$ at the Stanford Linear Accelerator Center. A light CP-odd Higgs boson is expected in extensions to the Standard Model such as Next to Minimal Supersymmetry. The Babar Collaboration searched for a light Higgs boson (A_0) produced in radiative decays of an Y meson ($Y \rightarrow \gamma A_0$). We saw no evidence of the A_0 decaying into $\mu^+\mu^-$, $\tau^+\tau^-$, hadrons, or invisible final states with a sample of 122 million $Y(3S)$, 99 million $Y(2S)$, and 23 million $Y(1S)$ from $Y(2,3S)$ decays collected at the PEP II B-factory. We set upper limits on product branching fractions $B(Y \rightarrow \gamma A_0) \times B(A_0 \rightarrow \text{various states})$ as low as 10^{-6} for A_0 masses from threshold up to $9\text{GeV}/c^2$. As a result, we exclude a large fraction of parameter space for Next to Minimal Supersymmetry. We also search for a dark Higgs boson motivated by astrophysical experiments using 516/fb of data collected with the BABAR detector. We could not find evidence of such a dark Higgs so we set upper limits on its branching fraction.

Presentation Type

Parallel Talk

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Session Classification: Parallel Session I: BSM, Exotics