

Abstract Submitted  
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**Search for Invisible Decays of Dark Photons and Low Mass Higgs Bosons at BaBar**<sup>1</sup> ALEXANDER GIUFFRIDA, Univ of California - Berkeley, BABAR COLLABORATION — The BaBar detector at the PEP-II asymmetric B-Factory collected a large dataset of  $e^+e^-$  collisions at the center-of-mass energies near Upsilon mesons. We use the BaBar dataset recorded in 2007-2008 to search for events that produce a high energy photon and no other visible decay products. Such invisible decays may occur through the process  $\Upsilon \rightarrow \gamma A$ , where  $A$  is a light CP-odd Higgs scalar, or  $e^+e^- \rightarrow \gamma A'$ , where  $A'$  is a Dark Photon vector particle. This search takes advantage of a high energy single photon trigger, so that such events would be recorded despite the lack of visible charged tracks. We have tuned our selection on 10% of the data collected with the single photon triggers. Our analysis uses machine learning techniques to enhance the selection efficiencies and suppress the backgrounds. For the final results, we apply our selection to the full data set of approximately 60 fb<sup>-1</sup>. We observed no significant signal, and set the upper limits on the branching ratio of  $\Upsilon \rightarrow \gamma A$  and cross section of  $e^+e^- \rightarrow \gamma A'$ . For the  $A'$  mode, our upper limits on the mixing strength parameter rule out the Dark Photon as an explanation for the  $a_\mu$  anomaly.

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