

Search for low-mass New Physics states at BABAR

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We present here the most recent BABAR results on searches for new particles with masses below the electroweak scale predicted by many extensions of the Standard Model (SM). The results are based on the full data set of about 500 fb^{-1} collected at the $\Upsilon(4S)$ resonance by the BABAR detector at the PEP-II collider.

We present, in particular, a search for a light dark-matter bound state (the darkonium Υ_D) produced in $B^+B^- \rightarrow \Upsilon_D B^+B^-$, with $\Upsilon_D \rightarrow B^0\bar{B}^0$ and the dark photons A' decaying to pair of leptons or pions, and a search for an Axion-Like Particle, A , produced in the Flavor-Changing Neutral-Current decay $B^0 \rightarrow \bar{B}^0 A$, with $A \rightarrow \gamma\gamma$, which is expected to be competitive with the corresponding SM electroweak processes. We present also searches for prompt and long-lived leptonically decaying hidden scalars produced in association with tau leptons. This search is sensitive to viable models that could account for the muon $g-2$ excess. Finally, we show the results of a search for Heavy Neutral Leptons of masses between 100 MeV and 1.3 GeV in $B^0\bar{B}^0$ decays.

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