

# Search for darkonium in $e^+e^-$ collisions at *BABAR*

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Many scenarios of physics beyond the Standard Model predict dark sectors containing new particles interacting only feebly with ordinary matter. Collider searches for these scenarios have largely focused on identifying signatures of new mediators, leaving much of the dark sector structure unexplored. We investigate the existence of a light dark-matter bound state, the darkonium, ( $\Upsilon_D$ ), predicted in minimal dark sector models, which can be produced through the reaction  $e^+e^- \rightarrow \gamma\Upsilon_D$ , with  $\Upsilon_D \rightarrow A'A'A'$  and the dark photons  $A'$  decaying to pair of leptons or pions. This search explores new dark sector parameter space, illustrating the importance of  $B$ -factories in fully probing low-mass new physics. The results are based on the full data set of about 500 fb<sup>-1</sup> collected at the  $\Upsilon(4S)$  resonance by the *BABAR* detector at the PEP-II collider.

## Category

talk

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