

Abstract Submitted  
for the GEC12 Meeting of  
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**Search for Positron Bound States in the Doubly Excited Region of the Helium Atom**<sup>1</sup> ROISIN BOADLE, JOSHUA MACHACEK, EMMA ANDERSON, JAMES SULLIVAN, STEPHEN BUCKMAN, CAMS, Australian National University, Canberra — Positron-atom binding has been the subject of many theoretical calculations in recent years. In these systems, a positron becomes temporarily bound to the atom, either through polarisation of the electronic charge cloud or formation of positronium (an  $e^-e^+$  pair) which is weakly bound to the atom. There is now theoretical evidence of numerous positron-atom bound states, including for the helium atom. Ground state helium is incapable of binding a positron; however, recent calculations [1] have indicated that excited metastable states and doubly excited states may do so. These bound states might be expected to manifest themselves as structure in the energy dependence of the cross sections for processes such as total scattering, positronium formation, or ionization. We have carried out an experimental search for these positronic helium states in the doubly-excited region near 58 eV, using our high-resolution, trap-based positron beam. Results from this study will be presented and their ramifications discussed.

[1] M.J. Bromley and J. Mitroy Private Communication (2012)

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