CENTRE FOR ANTIMATTER–MATTER STUDIES

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CAMS SEMINAR

'Remote Bond Breaking by Interacting Temporary Anion States'

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Seminar Room, Research School of Physical Sciences and Engineering

Abstract

Low energy electrons have been shown to induce strand breaks in DNA through the formation of temporary negative ion states. The locations of these states and the detailed mechanisms are largely unknown, although it has been suggested that electron attachment takes place initially to a DNA base followed by transfer to a site on the backbone where the strand break occurs. In this talk, I'll describe experimental and theoretical results in a series of much simpler molecules which possess the key components of the problem, namely, a site with a relatively long lived π* temporary anion and a second "remote" site characterized by a σ* anion state that can be readily dissociated, producing a bond break. The cross section for bond breaking is shown to depend critically on the lifetime of the lower anion state created by the coupling between the two resonances. The predicted cross sections are tested against experiment in a series of six compounds with different spatial separations between the locations of the anion states.

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