



The Abdus Salam
**International Centre
for Theoretical Physics**



**Conference on Frontiers of Nanoscience
24 August - 1 September 2015, Trieste, Italy**

Multi-particle content of Majorana zero-modes in the interacting p-wave wire

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Abstract:

In the topological phase of p-wave superconductors, zero-energy Majorana quasi-particle excitations can be well defined even in the presence of local density-density interactions. Here I outline recent work on this phenomenon (arXiv:1507.06539) where I employ matrix representations of the commutator $[H, \bullet]$ to characterise the multi-particle content of the many-body Majorana modes. I find that the multi-particle content of the Majorana zero-mode operators is significant even at modest interaction strengths and I outline why these findings appear to differ from some previous work on this topic.