Nuclear Theory

Jastrow functions in double-beta decay

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(Submitted on 3 Jan 2011)

We use simple analytic considerations and a Monte Carlo calculation of nucleons in a box to argue that the use of Jastrow functions as short-range correlators in the commonly employed two-body-cluster approximation causes significant errors in the matrix elements for double-beta decay. The Jastrow approach appears to agree with others, however, if many-body clusters are included. A careful treatment of the charge-changing analog of the nuclear pair density shows, in addition, that differences between Unitary Correlator Operator Method and Brueckner methods for treating short-range correlations in double-beta are less significant than suggested by previous work.

Comments:	6 pages, 5 figures
Subjects:	**Nuclear Theory (nucl-th)**
Journal reference:	Phys.Rev.C83:034317,2011
DOI:	10.1103/PhysRevC.83.034317
Report number:	LA-UR 10-08031
Cite as:	**arXiv:1101.0554 [nucl-th]**
	(or **arXiv:1101.0554v1 [nucl-th]** for this version)

Submission history

From: Jonathan Engel [view email]
[v1] Mon, 3 Jan 2011 16:25:06 GMT (25kb)

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