



Nuclear Theory

Investigation of level spacing distribution of nuclear energy levels by maximum likelihood estimation method

M. A. Jafarizadeh, N. Fouladi, H. Sabri, B. Rashidian Maleki

(Submitted on 5 Jan 2011 (v1), last revised 15 Aug 2011 (this version, v3))

The nearest neighbor spacing distribution (NNSD) is one of common methods in statistical analysis of nuclear energy levels. In this paper, we have proposed Maximum Likelihood Estimation (MLE) method to evaluate parameter of (NNSD)'s which explain chaotic and regular behavior of nuclear systems. Also with Cramer-Rao Lower Bound (CRLB) will obtain decreasing of uncertainty for our results in compare to previous methods. We calculate these parameters for different mass groups and nuclei with special values of deformation parameter, and also for nuclei with IBM's three dynamical symmetries and transitional regions between these three limits and confirm theoretical predictions even in cases where the small size of data don't allow exact conclusions with previous methods. We obtain better consistent of our results with Poisson and Wigner(GOE) distributions with Kullback-Leibeller divergence.

Comments: 31 pages, 7 figures

Subjects: **Nuclear Theory (nucl-th)**

Cite as: **arXiv:1101.0958 [nucl-th]**

(or **arXiv:1101.0958v3 [nucl-th]** for this version)

Submission history

From: Mohamad Ali Jafarizadeh [[view email](#)]

[v1] Wed, 5 Jan 2011 12:56:33 GMT (1436kb)

[v2] Sat, 28 May 2011 18:39:35 GMT (1436kb)

[v3] Mon, 15 Aug 2011 13:39:55 GMT (1027kb)

[Which authors of this paper are endorsers?](#)

Download:

- [PDF only](#)

Current browse context:

nucl-th

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1101](#)

References & Citations

- [INSPIRE HEP](#)
([refers to](#) | [cited by](#))
- [NASA ADS](#)

Bookmark (what is this?)

