

Quantum Physics

Does three-tangle properly quantify the three-party entanglement for Greenberger-Horne-Zeilinger-type states?

Eylee Jung, DaeKil Park, Jin-Woo Son

(Submitted on 17 Jan 2009 (v1), last revised 19 Jun 2009 (this version, v3))

Some mixed states composed of only GHZ states can be expressed in terms of only W -states. This fact implies that such states have vanishing three-tangle. One of such rank-3 states, $|\Pi_{\text{GHZ}}\rangle$, is explicitly presented in this paper. These results are used to compute analytically the three-tangle of a rank-4 mixed state $|\sigma\rangle$ composed of four GHZ states. This analysis with considering Bloch sphere S^{16} of $d=4$ qudit system allows us to derive the hyper-polyhedron. It is shown that the states in this hyper-polyhedron have vanishing three-tangle. Computing the one-tangles for $|\Pi_{\text{GHZ}}\rangle$ and $|\sigma\rangle$, we prove the monogamy inequality explicitly. Making use of the fact that the three-tangle of $|\Pi_{\text{GHZ}}\rangle$ is zero, we try to explain why the W -class in the whole mixed states is not of measure zero contrary to the case of pure states.

Comments: 10 pages, no figure V2: new calculational results are included.
11 pages: V3 accepted in the Rapid Communication of PRA, 4 pages (two column)

Subjects: **Quantum Physics (quant-ph)**

Journal reference: Phys. Rev. A 80 (2009) 010301(R)

DOI: [10.1103/PhysRevA.80.010301](https://doi.org/10.1103/PhysRevA.80.010301)

Report number: KNTP-09-02

Cite as: [arXiv:0901.2620v3](https://arxiv.org/abs/0901.2620v3) [quant-ph]

Submission history

From: DaeKil Park [[view email](#)]

[\[v1\]](#) Sat, 17 Jan 2009 10:02:59 GMT (7kb)

[\[v2\]](#) Tue, 3 Feb 2009 13:32:54 GMT (9kb)

[\[v3\]](#) Fri, 19 Jun 2009 06:13:33 GMT (8kb)

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

Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

quant-ph

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

[new](#) | [recent](#) | [0901](#)

References & Citations

- [SLAC-SPIRES HEP](#)
([refers to](#) | [cited by](#))
- [CiteBase](#)

Bookmark (what is this?)

[CiteULike logo](#)

[Connotea logo](#)

[BibSonomy logo](#)

[Mendeley logo](#)

[Facebook logo](#)

[del.icio.us logo](#)

[Digg logo](#)

[Reddit logo](#)