



Quantum Physics

# A complete set of multidimensional Bell inequalities

[François Arnault](#)

(Submitted on 12 Jul 2011 (v1), last revised 24 Oct 2011 (this version, v2))

We give a multidimensional generalisation of the complete set of Bell-correlation inequalities given by Werner and Wolf, and by Zukowski and Brukner, for the two-dimensional case. Our construction applies for the  $n$  parties, two-observables case, where each observable is  $d$ -valued. The  $d^n$  inequalities obtained involve homogeneous polynomials. They define the facets of a polytope in a complex vector space of dimension  $d^n$ . We also show that these inequalities are violated by Quantum Mechanics. We exhibit examples in the three-dimensional case.

Comments: 14 pages, 1 figure. Plain TeX file This version 2 adds Section 7 about violations. Section 8 (the case  $d=3$ ) and bibliography have been extended accordingly

Subjects: **Quantum Physics (quant-ph)**; Mathematical Physics (math-ph)

Cite as: [arXiv:1107.2255](#) [quant-ph]  
(or [arXiv:1107.2255v2](#) [quant-ph] for this version)

## Submission history

From: François Arnault [[view email](#)]

[v1] Tue, 12 Jul 2011 12:02:14 GMT (22kb)

[v2] Mon, 24 Oct 2011 14:34:44 GMT (25kb)

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

Link back to: [arXiv](#), [form interface](#), [contact](#).

## Download:

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

Current browse context:

quant-ph

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

[new](#) | [recent](#) | [1107](#)

Change to browse by:

[math](#)

[math-ph](#)

## References & Citations

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

Bookmark([what is this?](#))

