

# Web of Science

[Full Text from Publisher](#) | 
 [Look Up Full Text](#) | 
 | 
 Save to EndNote online | 
 [Add to Marked List](#)

212 of 499

## Quantum information approach to the azurite mineral frustrated quantum magnet

By: [Batle, J](#) (Batle, J.)<sup>[1]</sup>; [Ooi, CHR](#) (Ooi, C. H. Raymond)<sup>[2]</sup>; [Abutalib, M](#) (Abutalib, M.)<sup>[3]</sup>; [Farouk, A](#) (Farouk, Ahmed)<sup>[4]</sup>; [Abdalla, S](#) (Abdalla, S.)<sup>[5]</sup>  
[View ResearcherID and ORCID](#)

**QUANTUM INFORMATION PROCESSING**  
**Volume:** 15 **Issue:** 7 **Pages:** 2839-2850  
**DOI:** 10.1007/s11128-016-1317-9  
**Published:** JUL 2016  
[View Journal Impact](#)

### Abstract

Quantum correlations are almost impossible to address in bulk systems. Quantum measures extended only to a few number of parties can be discussed in practice. In the present work, we study nonlocality for a cluster of spins belonging to a mineral whose structure is that of a quantum magnet. We reproduce at a much smaller scale the experimental outcomes, and then, we study the role of quantum correlations there. A macroscopic entanglement witness has been introduced in order to reveal nonlocal quantum correlations between individual constituents of the azurite mineral at nonzero temperatures. The critical point beyond which entanglement is zero is found at  $T_c < 1K$ .

### Keywords

**Author Keywords:** Nonlocality; Quantum phase transition; Quantum magnet  
**KeyWords Plus:** T-C SUPERCONDUCTORS; EQUILIBRIUM PHASE; BELL INEQUALITY; ENTANGLEMENT; STATES

### Author Information

**Reprint Address:** Batle, J (reprint author)  
 + Univ Illes Balears, Dept Fis, Palma De Mallorca 07122, Balearic Island, Spain.

#### Addresses:

- + [ 1 ] Univ Illes Balears, Dept Fis, Palma De Mallorca 07122, Balearic Island, Spain
- + [ 2 ] Univ Malaya, Dept Phys, Kuala Lumpur 50603, Malaysia
- + [ 3 ] King Abdulaziz Univ, Fac Sci, Dept Phys, Al Faisaliah Campus, Jeddah, Saudi Arabia
- [ 4 ] Al Zahra Coll Women, Dept Informat Technol, POB 3365, Muscat, Oman
- + [ 5 ] King Abdulaziz Univ, Fac Sci, Dept Phys, POB 80203, Jeddah 21589, Saudi Arabia

**E-mail Addresses:** [jbv276@uib.es](mailto:jbv276@uib.es)

### Funding

| Funding Agency   | Grant Number               |
|--|----------------------------|
| High Impact Research MoE Grant from the Ministry of Education Malaysia | UM.C/625/1/HIR/MoE/CHAN/04 |

[View funding text](#)

### Publisher

SPRINGER, 233 SPRING ST, NEW YORK, NY 10013 USA

### Categories / Classification

**Research Areas:** Physics

### Citation Network

0 Times Cited  
 36 Cited References  
[View Related Records](#)  
[Create Citation Alert](#)  
*(data from Web of Science Core Collection)*

### All Times Cited Counts

- 0 in All Databases
- 0 in Web of Science Core Collection
- 0 in BIOSIS Citation Index
- 0 in Chinese Science Citation Database
- 0 in Data Citation Index
- 0 in Russian Science Citation Index
- 0 in SciELO Citation Index

### Usage Count

Last 180 Days: 1  
 Since 2013: 4  
[Learn more](#)

**This record is from:**  
**Web of Science Core Collection**  
 - Science Citation Index Expanded

### Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

**Web of Science Categories:** Physics, Multidisciplinary; Physics, Mathematical

### Document Information

**Document Type:** Article

**Language:** English

**Accession Number:** WOS:000379623500012

**ISSN:** 1570-0755

**eISSN:** 1573-1332

### Journal Information

**Table of Contents:** [Current Contents Connect](#)

**Impact Factor:** [Journal Citation Reports](#)

### Other Information

**IDS Number:** DR0UX

**Cited References in Web of Science Core Collection:** **36**

**Times Cited in Web of Science Core Collection:** **0**