PSC-CUNY Research Awards (Enhanced)

Control No: ENHC-45-88
Rank: Professor
Tenured: Yes
College: HUNTER COLLEGE
Panel: Physics & Engineering
Discipline: Physics
Co-PI:

Name: Bergou, Janos
Address:
Telephone:
Email:

Human Subject Use No
Animal Subject Use No
Supplementary Materials No
List of Supplementary Material
Will Interviews be Conducted? No
Department PHYSICS AND ASTRONOMY
List of Undesirable Reviewers No

Title of Proposed Project:
Quantum state discrimination: outstanding open problems

Brief Abstract
Recently we have made significant progress in the area of quantum state discrimination by solving two of the longest standing unsolved problems: unambiguous discrimination among more than two pure quantum states and optimal interpolation between the minimum error and the unambiguous strategies. In this project the PI with three graduate students will further investigate these problems. In the area of unambiguous discrimination we will generalize the solution from pure states to mixed states, another longstanding unsolved problem in itself. In the area of the optimal interpolation strategy we will generalize the strategy from pure to mixed states, a problem called subspace discrimination. We will also develop a linear optical implementation of the optimal scheme, using one-photon interferometry. In addition, we will apply these techniques to two recently emerging problems: the discrimination of continuous variable states, a rapidly evolving area in quantum information processing; and to the theory of optimized sequential measurements based on our own recent work.

Relevant Publications & Scholarship
List of publications by Dr. János Bergou
[Reprinted in Key Papers in Physics, Published by the American Institute of Physics "Non Classical Effects in Quantum Optics" Editors: P.Meystre and D.Walls, AIP(1991)].
81. J. Bergou and P. Bogár, Phase structures in the micromaser photon statistics,
106. M. Mohseni, A. M. Steinberg, and J. Bergou, Optical realization of optimal


137. Q. Lin, B. He, and J. Bergou, Processing multiphoton states through operation on a single photon: Methods and applications, Physical Review A 80, 042311 (2009).


139. M. Jakob and J. Bergou, Quantitative complementary relations in bipartite systems: Entanglement as a physical reality, Optics Communications 283, 827-830 (2010).


Internal reports and institutional preprints
170. J. Bergou and M. Orszag, A QKD scheme based on communicating via two unknown states, Preprint, Catholic University of Santiago, Chile (2007).

Books and book chapters
173. J. Bergou and M. O. Scully, An example of symmetry breaking in nonlinear optics, in Frontiers of Nonequilibrium Statistical Physics, eds. G. T. Moore and M. O. Scully, NATO


Published conference proceedings


188. J. Bergou and S. Varró, Quantum mechanical states of the system "electron + quantized radiation mode", ibid, paper A-3.


191. J. Bergou and F. Ehlotzky, Behaviour of a model atom in a uniform magnetic and a laser field, ibid, pp. 200-204.


Patents


### Education

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<th>Institution</th>
<th>Degree</th>
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<td>Hungarian Academy of Sciences</td>
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<td>Roland Eotvos University (Budapest)</td>
<td>Ph.D</td>
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### Other Current & Past Funding (last 5 years)

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### Attachments

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