中里　研究活動　2019 年度報告

出版された論文

[1] Bounds on mixed state entanglement,
Bruno Leggio, Anna Napoli, Hiromichi Nakazato, and Antonino Messina,
Entropy **22** (2020, January) 62 (14 pages).

[2] Generalized adiabatic theorem and strong-coupling limits,
Daniel Burgarth, Paolo Facchi, Hiromichi Nakazato, Saverio Pascazio, and Kazuya Yuasa,
Quantum **3** (2019, June) 152 (23 pages).

[3] Analytically solvable 2×2 PT-symmetry dynamics from su(1,1)-symmetry problems,
R. Grimaudo, A. S. M. de Castro, H. Nakazato and A. Messina,
Physical Review A **99** (2019, May) 052103 (7 pages).

[4] Experimental investigation of quantum decay at short, intermediate and long times via integrated photonics,
Andrea Crespi, Francesco V. Pepe, Paolo Facchi, Fabio Sciarrino, Paolo Mataloni, Hiromichi Nakazato, Saverio Pascazio, and Roberto Osellame,
Physical Review Letters **122** (2019, April) 130401 (6 pages).

Research summary in 2019

On the basis of the recent proposal for the new parametrization of evolution operators for quantum two-level systems, a protocol for explicitly constructing the exact evolution operators generated by 2×2 time-dependent PT-symmetric Hamiltonians is proposed. Its mathematical applicability is illustrated with the help of appropriate examples. The physical relevance of the proposed approach within gain-loss system scenarios, like two coupled waveguides, is discussed in detail.

On the other hand, in the general framework of mixed states, an explicit bound for bipartite NPT entanglement is derived on the basis of the mixedness characterization of the physical system. The result derived is very general, being based only on the assumption of finite dimensionality. In addition it turns out to be of experimental interest since some purity measuring protocols are known. Exploiting the bound in the particular case of thermal entanglement, a way to connect thermodynamic features to monogamy of quantum correlations is suggested, and some recent results on the subject are given a physically clear explanation.