

2018 Annual Meeting of the APS Four Corners Section

Volume 63, Number 16

Friday–Saturday, October 12–13, 2018; University of Utah,
Salt Lake City, Utah

[Session L04: General Physics: Quantum Control](#)

11:20 AM–12:32 PM, Saturday, October 13, 2018
CSC Room: 10/14

Chair: Ivan Smalyukh, University of Colorado Boulder

Abstract ID: BAPS.2018.4CS.L04.6

**Abstract: L04.00006 : Quantum Control of the Squeezing Operator with
Dynamics using Wei-Norman Factorization and the Time Evolution Operator***

12:20 PM–12:32 PM

 [Abstract](#)

Presenter:

Riley Martell

(Washington University in St. Louis, Brigham Young University)

Authors:

Riley Martell

(Washington University in St. Louis, Brigham Young University)

Manuel Berrondo

(Brigham Young University)

Ty Beus

(Brigham Young University)

Ray Hagimoto

(University of Texas at San Antonio)

Jean-Francois VanHuele
(Brigham Young University)

Control of quantum phenomena would allow for expanding control theory from classical systems to microscopic ones whose behavior is dictated by quantum mechanics. A current goal of quantum control is to develop a systematic methodology for the manipulation of systems. The approach typically used to solve dynamic quantum systems is useful to analyze characteristics of a system represented by a defined operator. The squeeze operator's actions are characterized by finding the time evolution operator using the Wei-Norman method on the associated Hamiltonian and applying this to number (Fock) states, coherent states, and Schrodinger cat states. This specific case analyzing the Squeeze operator shows that the Wei-Norman method to find time-evolution operator can reveal the dynamics of any system with an associated Lie Algebra basis. Documenting a variety of initial states and initial parameters in a library of cases provides a foundation to achieving greater control in experimental applications as well.

*I would like to thank Brigham Young University for hosting this Research Experience for Undergraduates program and the National Science Foundation for funding this research through grant #1757998.

To cite this abstract, use the following reference: <http://meetings.aps.org/link/BAPS.2018.4CS.L04.6>