

Abstract Submitted  
for the DAMOP07 Meeting of  
The American Physical Society

Sorting Category: 5 (T)

**Multipartite squeezed states as  $SU(1, 1)$  coherent states**<sup>1</sup> ZAHRA SHATERZADEH YAZDI, PETER S. TURNER, BARRY C. SANDERS, University of Calgary — One goal of quantum information science is quantum information processing using complex quantum optical networks comprising passive and active linear optical elements, such as beam splitters and squeezers. Such a network can be described mathematically as a  $Sp(2n, \mathbb{R})$  transformation on  $n$  modes, which corresponds to mappings that preserve Gaussian states. Recently tripartite squeezed states have been produced experimentally and are quite useful for quantum information tasks such as quantum state sharing and quantum teleportation. We have developed a theoretical framework for three-boson realizations of  $SU(1, 1)$  and characterized all squeezed states of this type as  $SU(1, 1)$  coherent states. Inspired by the elegance of this theory, we generalize it to multi-boson realizations of  $SU(1, 1)$  that characterize any multiport linear optical system constructed from a two-mode squeezer and several passive elements, or by concatenating such multiport systems to each other. Thus, this theory gives us new insight into the properties of multipartite squeezed states generated in any complex optical network with concatenated sections each with one two-mode squeezer.

<sup>1</sup>This work has been supported by iCORE

Prefer Oral Session  
 Prefer Poster Session

Zahra Shaterzadeh Yazdi  
zshaterz@ucalgary.ca  
University of Calgary

Date submitted: 02 Feb 2007

Electronic form version 1.4