Multipartite squeezed states as SU(1, 1) coherent states[1] 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, 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.

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