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Approximate reversal of quantum Gaussian dynamics LUDOVICO LAMI, Universitat Autnoma de Barcelona, SIDDHARTHA DAS, MARK WILDE, Louisiana State Univ - Baton Rouge — Recently, there has been focus on determining the conditions under which the data processing inequality for quantum relative entropy is satisfied with approximate equality. The solution of the exact equality case is due to the work of Petz, who showed that the quantum relative entropy between two states stays the same after the action of a quantum channel if and only if there is a *reversal channel* that recovers the original states after the channel acts. Furthermore, this reversal channel can be constructed explicitly and is now called the *Petz recovery map*. Recent developments have shown that a variation of the Petz recovery map works well for recovery in the case of approximate equality of the data processing inequality. Our main contribution here is a proof that bosonic Gaussian states and channels possess a particular closure property, namely, that the Petz recovery map associated to a bosonic Gaussian state σ and a bosonic Gaussian channel \mathcal{N} is itself a bosonic Gaussian channel. We furthermore give an explicit construction of the Petz recovery map in this case, in terms of the mean vector and covariance matrix of the state σ and the Gaussian specification of the channel \mathcal{N} .

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