

# SAIP2014



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## **A Monte Carlo Simulation of a Noisy Quantum Channel with Memory**

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### **Abstract :**

The classical capacity of quantum channels is well understood for channels with uncorrelated noise. For the case of correlated noise, however, there are still open questions. We calculate the classical capacity of a forgetful channel constructed by Markov switching between two depolarizing channels. Techniques have previously been applied to approximate the output entropy of this channel and thus its capacity. In this paper, we use a Metropolis-Hastings Monte Carlo approach to numerically calculate the entropy. The algorithm is implemented in parallel and its performance is studied and optimized. The effects of memory on the capacity is explored and previous results are confirmed to higher precision.

### **Award :**

Yes

### **Level :**

PhD

### **Supervisor :**

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### **Paper :**

Yes

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