

MATHEMATICS CCT COLLOQUIUM  
Louisiana State University, Baton Rouge  
Friday March 31, 2006  
9:00 am - 10:00 am  
338 Johnston Hall/CCT

**Mathematical Problems in Quantum Information Theory**

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Attempts to extend Shannon's noisy coding theorem to a quantum setting have led to interesting mathematical questions concerning products of completely positive maps on matrix algebras. Specifically for trace-preserving maps it is conjectured that the output state with minimal entropy is always a product state -- this is equivalent to the statement that minimal output entropy is additive for such maps. I will review the background to this problem, and describe its relation to some inequalities that arose in different contexts, including strong subadditivity and Hanner's inequality. I will then show how some new matrix inequalities can be used to prove special cases of this result.