

# APPLIED MATHEMATICS COLLOQUIUM

## ALGEBRAIC CONSTRUCTIONS OF GRASSMANNIAN PACKINGS

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### ABSTRACT:

A complex Grassmannian packing is a collection of  $m$ -dimensional subspaces in a complex space of dimension  $n$ ,  $m < n$ . A good packing has to have large size and large minimum distance that is any two subspaces of the packing have to be far away from each other in some metric. Grassmannian packings find applications in statistics and wireless communications.

In this talk I present two algebraic constructions of Grassmannian packings with large minimum distance under the chordal metric. The first construction is based on the use of Heisenberg-Weyl groups and a generalization of Boolean functions for the case of linear operators. The second construction is based on a generalization of some results of representation theory. The obtained Grassmannian packings are strongly related to binary Reed-Muller error correcting codes. In the second part of the talk I outline the application of the Grassmannian packings to wireless communications, in particular to information transmission with many antennas.

This is joint work with A. R. Calderbank.

**MONDAY, MARCH 10, 2008**

**4:30 PM**

**Building 2, Room 105**

*Reception at 4:00 PM in Building 4, Room 174  
(Math Majors Lounge)*

Applied Math Colloquium: <http://www-math.mit.edu/amc/spring08>  
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