



# Hamilton Institute

## Costas Arrays

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### *Abstract*

Costas arrays are square arrangements of dots and blanks such that each column and row contains exactly one dot and such that the dots form no parallelograms. They have many applications in engineering, in particular in sonars and radars, but also in clock synchronization etc. Despite being investigated since about 1965, many important questions still remain open: even their existence for all orders has not been proved (or disproved) yet.

In this talk a survey of the state of research in Costas arrays today will be offered. The definitions and the basic algebraic construction methods available will be stated, and some of their most important properties will be mentioned. The main part of the talk, however, will focus on the recent results obtained by the Costas arrays research group in the Claude Shannon Institute / UCD CASL:

- Generalization of the Costas property in higher dimensions;
  - Generalization of the Costas property in the continuum;
  - Auto- and cross-correlation of Costas arrays;
  - Symmetry of the algebraic constructions;
  - Relation between Costas arrays and Perfect Nonlinear Functions;
- and (time permitting) more...

No prior familiarity with the subject of Costas arrays will be assumed. Some basic facts about finite fields will be briefly explained as necessary.

**Venue:** Seminar Room, Hamilton Institute, Rye Hall,  
NUI Maynooth

**Time:** 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at [www.hamilton.ie](http://www.hamilton.ie)



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