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## Introduction

The various concepts proposed for the SKA have inherently different fields of view and they also behave differently with frequency. These properties are illustrated here.

### Dish with Multi-Cluster Feeds

The field centres are fixed and at all frequencies there is no overlap between field. The single feed case is a subset of this.

### Dish with Phased Array Feeds

The maximum field of view is approximately constant. Within this area field centres can be placed anywhere. A rectangular grid of field centres is illustrated. Open circles represent intermediate field centres. Alternating in time between these and the inner green field centres gives uniform coverage for an interferometer and Nyquist power sampling.

At lower frequencies there is choice between filling the approximately constant field of view with adjoining beams or at a greater beamforming cost fixed field centres which are ideal for pulsar observing.

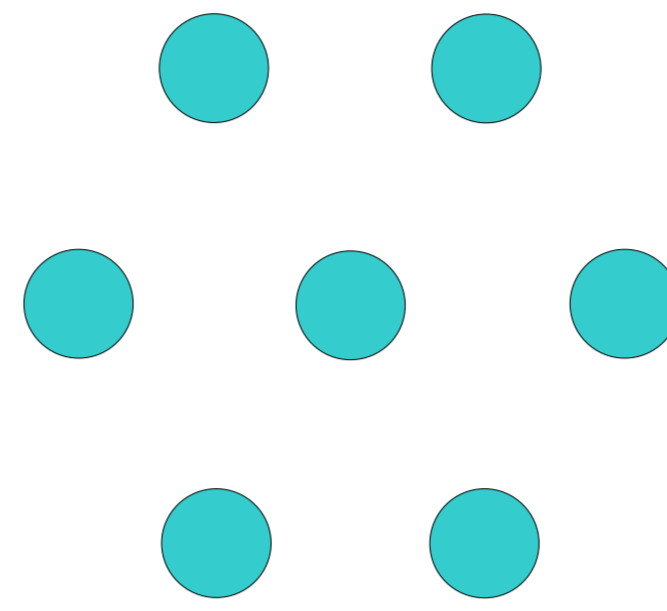
### Aperture Array

The aperture array is the most versatile of the concepts. It can operate in any of the modes that the reflector concepts can operate. If beamformer and processing costs dominate two other useful modes are where the field of view simply scales directly with  $\lambda$  in both dimensions to give a field of view that scales as  $\lambda^2$ . Also note that the fractional bandwidth scales as  $\lambda$ , which releases processing and transmission bandwidth allowing extra field centres to be added. In this case the field of view varies as  $\lambda^3$ .

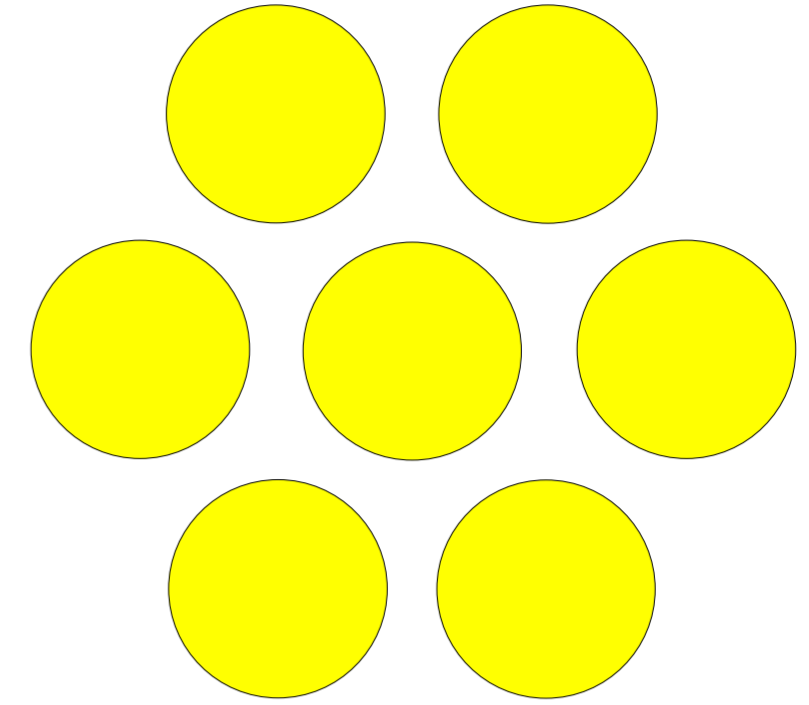
### Cylindrical Reflector

For the cylindrical reflector the field of view can be changed by adding more field centres along a single dimension. At longer wavelengths constant field centres can be kept giving a field of view that varies as  $\lambda$ . Keeping the fields adjacent gives a  $\lambda^2$  variation. For surveying, more beams can be added as  $\lambda$  increases giving a  $\lambda^3$  variation.

Twice minimum frequency

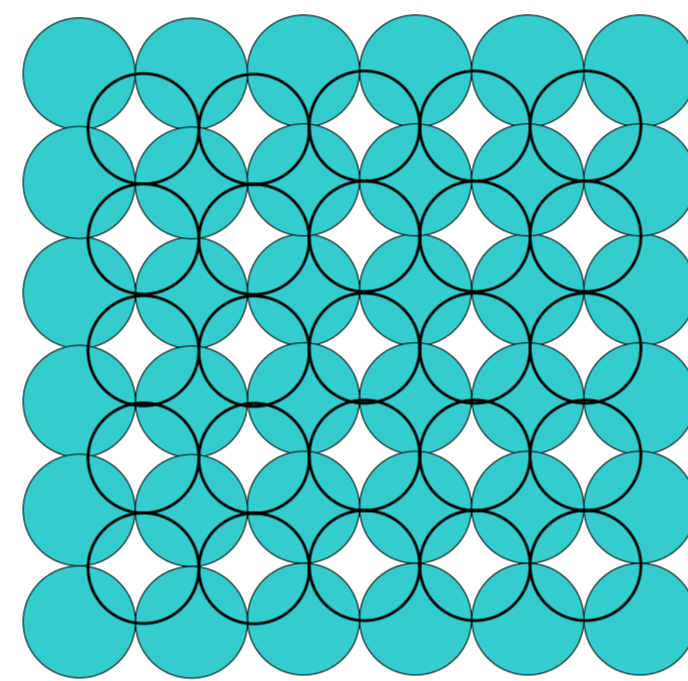


Minimum frequency

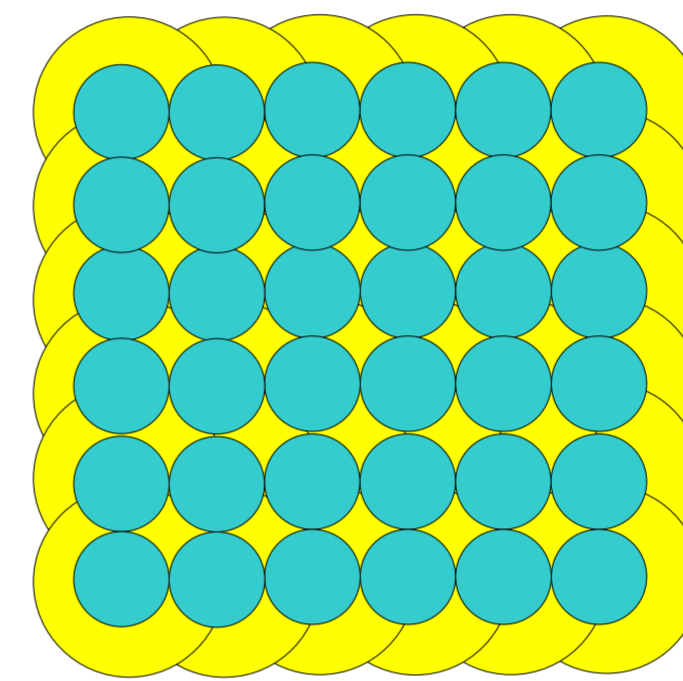


Dish with Multi-Cluster Feeds

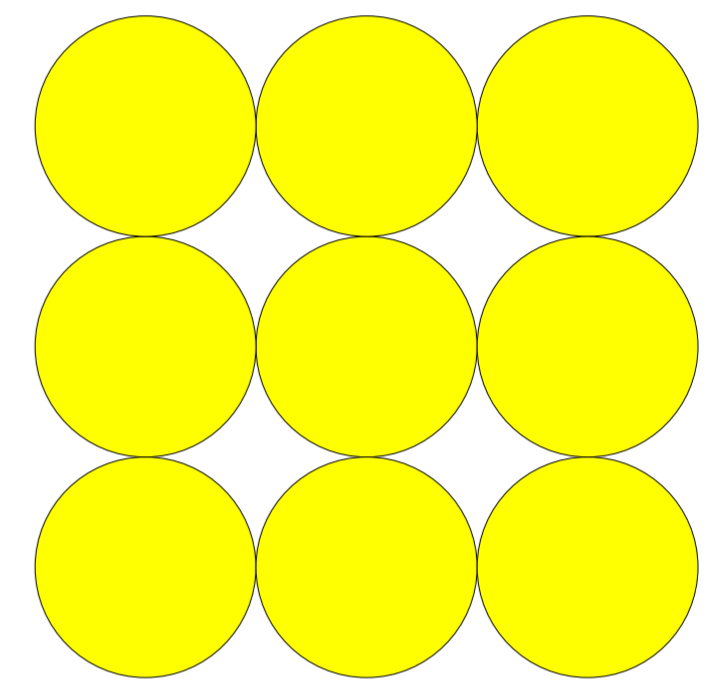
Maximum Frequency also showing overlapping fields



2:1 in frequency fixed field centers

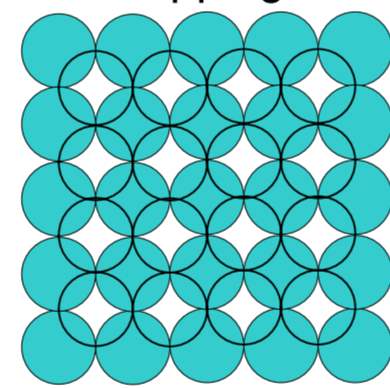


Half maximum frequency

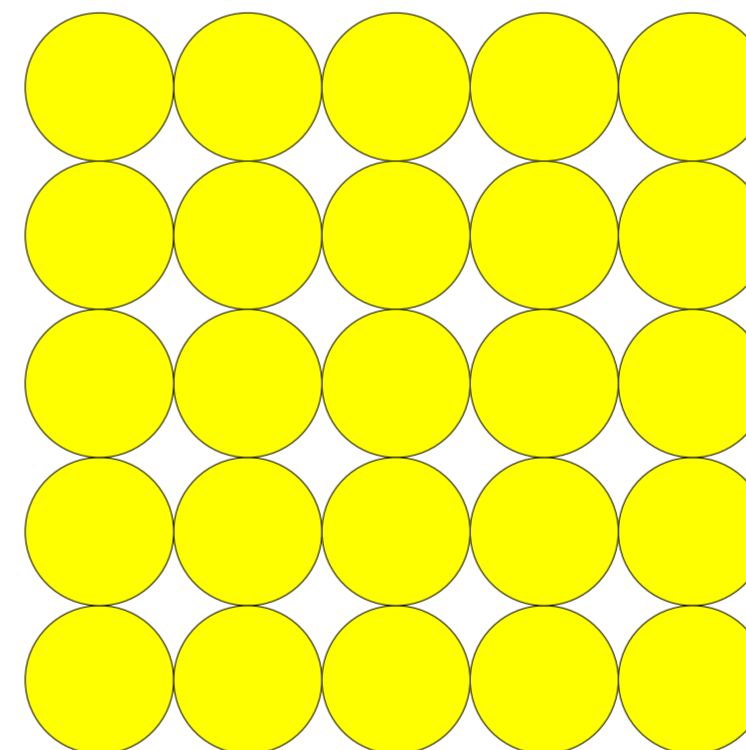


Dish with Phased Array Feeds

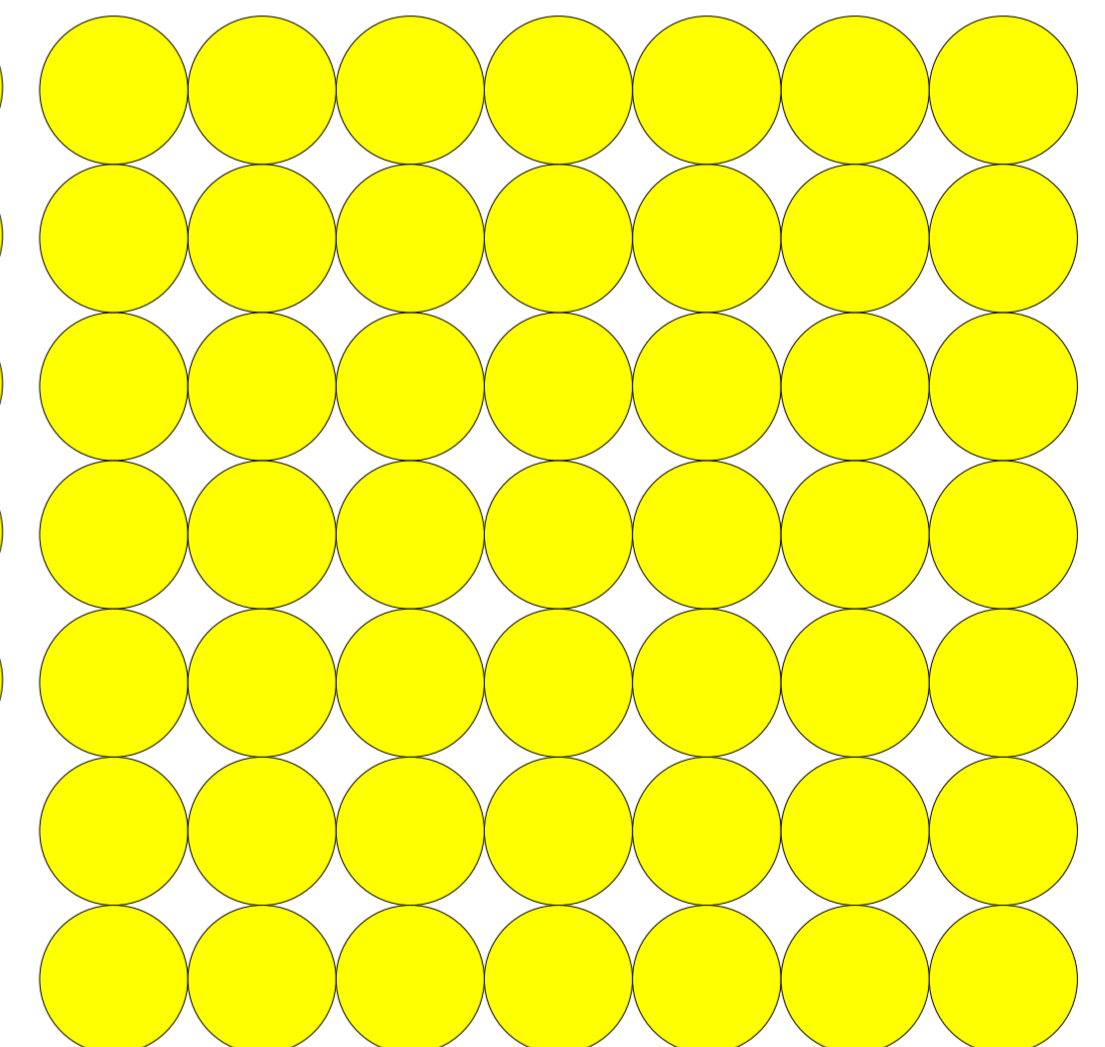
Maximum Frequency also showing overlapping fields



Half maximum frequency, field of view prop.  $\lambda^2$

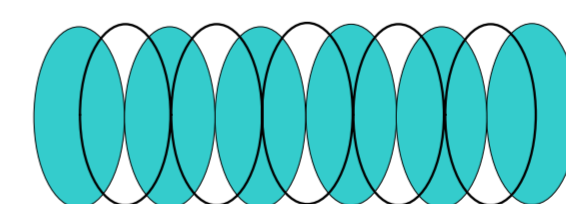


Half maximum frequency, field of view prop.  $\lambda^3$

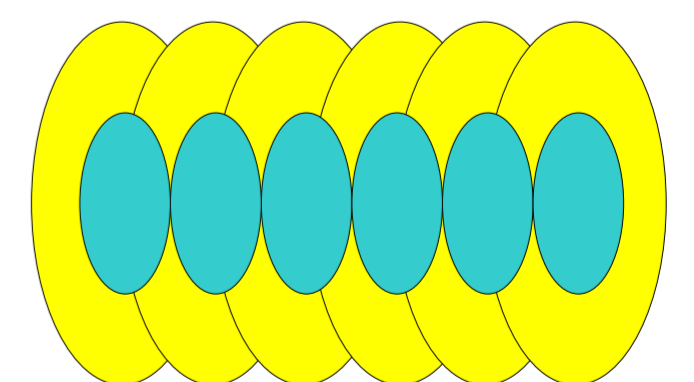


Aperture Array

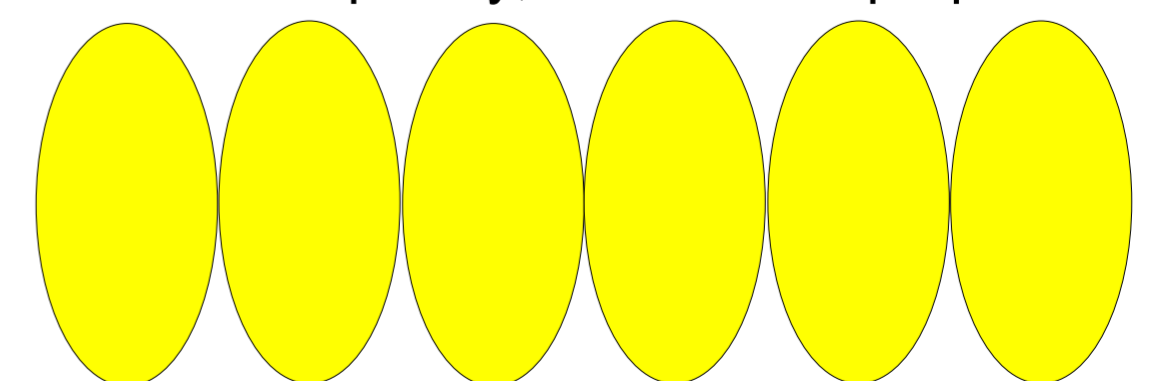
Maximum Frequency also showing overlapping fields



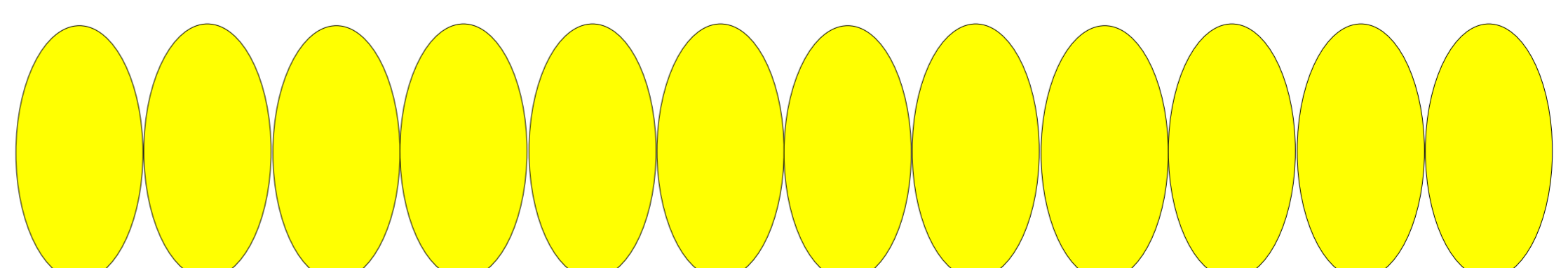
2:1 in frequency fixed field centers



Half maximum frequency, field of view prop.  $\lambda^2$



Half maximum frequency, field of view prop.  $\lambda^3$



Cylindrical Reflector