## DPPs

A descending plane partition of size $n$ is an array of successively intended rows filled with positive integers less or equal than $n$ such that

- the number of entries in a row is less than the largest entry in that row,
- the entries are weakly decreasing along rows and strictly decreasing along columns.


## ASTs

An alternating sign triangle of size $n$ is a triangular configuration of $n$ centred rows with entries $-1,0,1$ such that

- the $i$-th row counted from the bottom has $2 i-1$ elements,
- the non-zero entries alternate in all rows and columns,
- all row-sums are 1 ,
- the topmost non-zero entry is 1 for all columns.


## FPLs

A fully packed loop of size $n$ is an edge-colouring of the $n \times n$ grid with $n$ external edges such that

- ever vertex has two incident red and two incident blue coloured edges,
- the external edges are coloured alternately starting with the top left external edge being red.



## Square ice

A square ice of size $n$ is an arrangement of $n^{2}$ water molecules, where the O -atoms are placed on an $n \times n$ grid with interlacing H -atoms and H -atoms at the left and right boundary.

## TSSCPP

A totally symmetric self complementary plane partition of size $n$ is filling of a $2 n \times 2 n \times 2 n$ box with unit-cubes such that

- the configuration stays invariant under reflection and interchanging the axes $X, Y, Z$,
- the "empty part" of the $2 n \times 2 n \times 2 n$ box forms the same configuration.


## Six-vertex configuration

A six-vertex configuration of size $n$ is an $n \times n$ grid with $n$ external edges together with an orientation of the edges such that

- every vertex has two edges pointing to it and two edges pointing away,
- the left and right boundary edges are orientated inward and the bottom and top boundary are orientated outward.


## What's known

- For $n$ a positive integer and one of the above families, the number of objects of size $n$ is $\prod_{i=0}^{n-1} \frac{(3 i+1)!}{(n+i)!}$.
- We can relate ASMs, FPLs, square ice and six-vertex configurations.


## What's open

- Relate all different families.
- Transfer existing generalisations of one type to the others.
- Explicite formulas for certain refined enumerations are known.

