**This is a short documentation for 2-crc cross counter flow evap and the 3circ cross counter flow evap**

**Valid for**

evap\_2\_circ\_cross\_couter\_flow-version2.py “2circ”

evap\_N\_circ\_cross\_couter\_flow.py “Ncirc”

**Note:** need to place the above files in D:\Purdue\DOE Project\Simulation to make it work correctly, otherwise the wrong submodules are chosen.

**Main structure of evaporator**

The evaporator is divided into two coil sheets, A and B. The refrigerant flow is always from a Bi cell to an Ai cell. The airflow is either from inlet to Ai cell to Bi cell (normal layout) or from Ai cell to Bn-I cell (interleaved). This definitian was chosen since it makes it easier to track the refrigerant flow.

The 2circ version has a fixed number of 2 circuits while the Ncirc version can easily be modified to any number of circuits (even or odd) by adjusting *num\_evaps* and the maldistribution parameters.

A0

A1

A2

B1

B2

B3

Air

ref

ref

ref

Figure : Evaporator structure

**Refrigerant side flowrates**

During the calculation process, the total flowrate self.mdot\_r is divided to obtain the per circuit flowrate, e.g mdot\_r/num\_circuits(of actual evaporator). Refrigreant side maldistribution can be set as shown in the examples in the file.

**Interleaved circuitry**

For the interleaved circuitry (self.interleaved=True), the air flows are redirected crosswise. For odd circuitnumbers, the middle circuit is always in cross counterflow with no interleaving.

**Hybrid control emulation**

For the hybrid control, two options exist:

* *self.Hybrid=’equal\_flow’*
  + refrigerant side flowrate is adjusted to be identical to airside flowrate (found to be a good assumption for LRCS hybrid control)
* self.Hybrid= ‘qual\_flow\_DT\_in’
  + refrigerant flowrate is adjusted according to air inlet temperature difference