VS model

- Very Simple gas balance model
- Three terms:
  - Input
  - Pressure
  - Output

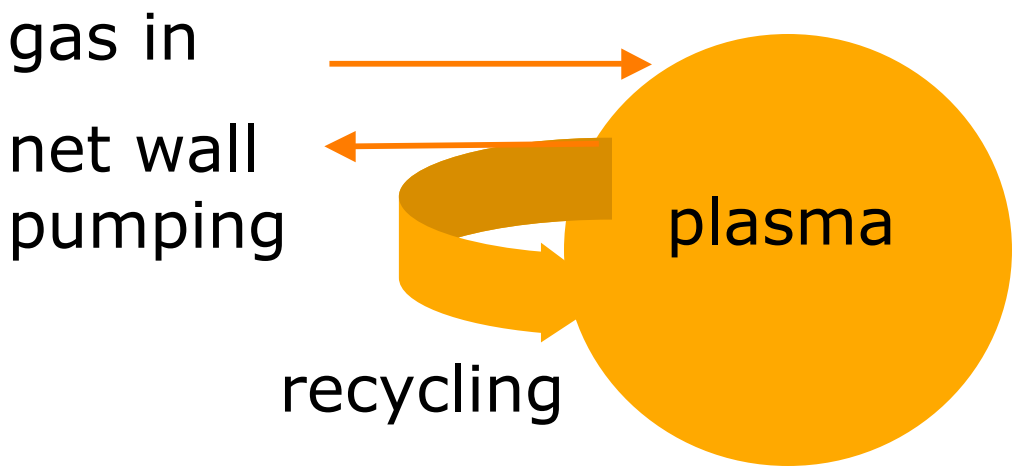
In steady state:

Gas in (torr-liters/s) = Pressure (torr) * Net pumping (liters / s)

Net pumping is gross pumping * recycling coefficient.

Aim is not to have exact predictions, but a highly transparent, easy to understand tool to aid intuition

Case A graphite without lithium



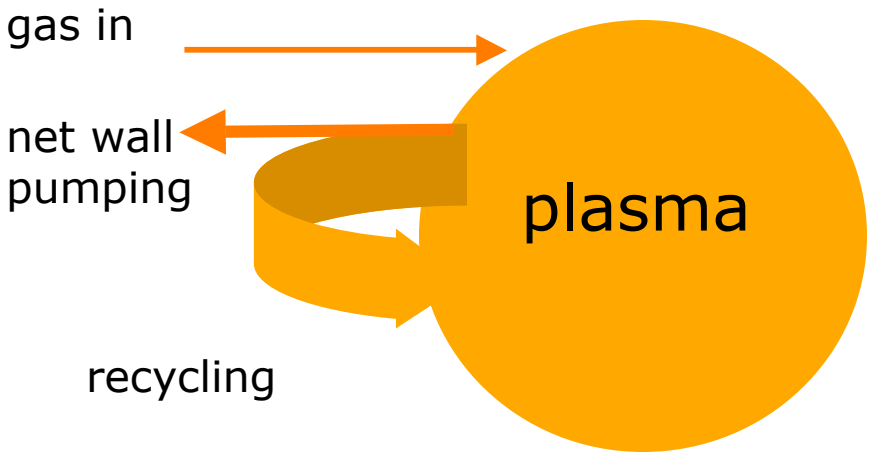
Suppose gas input = 2 torr-liters / s

- Gross pumping = 100 liters/s
- Recycling = 98%
- Net wall pumping = 2 liters / s
- Pressure/density = 2/2 = 1

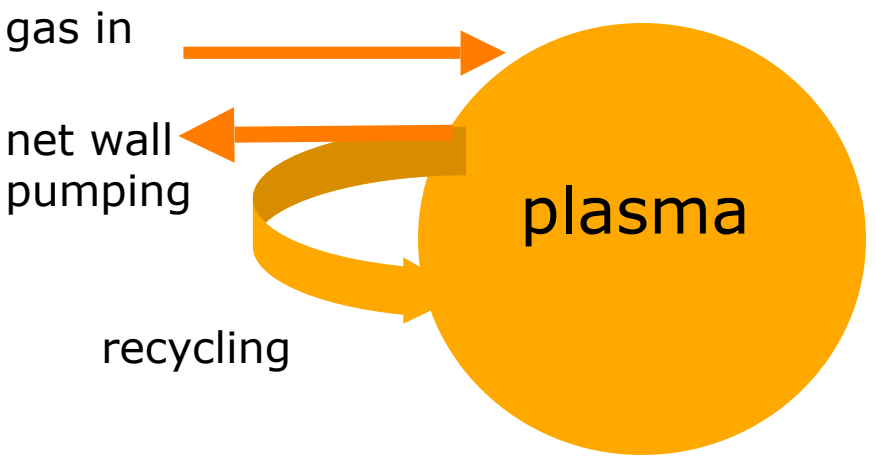
Case B lithiated graphite

Suppose gas input = 2 torr-liters / s
- Gross pumping = 100 liters/s
- Recycling = 96%
- Net wall pumping= 4 liters / s
- Pressure/density = 2/4 = 0.5

Pressure/density is half !



Or double gas input = 4 torr-liters / s
- Gross pumping = 100 liters/s
- Less recycling = 92% (Canik)
- Net wall pumping= 8 liters / s
- Pressure/density = 4/8 = 0.5

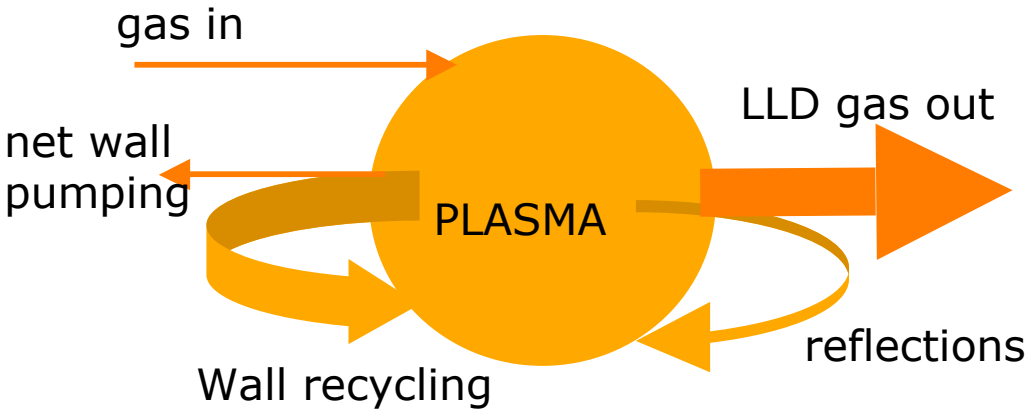


Case C: Lithiated Graphite + Liquid Lithium Divertor

Suppose:

Outboard / total efflux	= 80%
Down / (Up+Down)	= 50%
LLD toroidal coverage	= 90%
LLD width factor	= 83%

Combined LLD interception factor = 30%



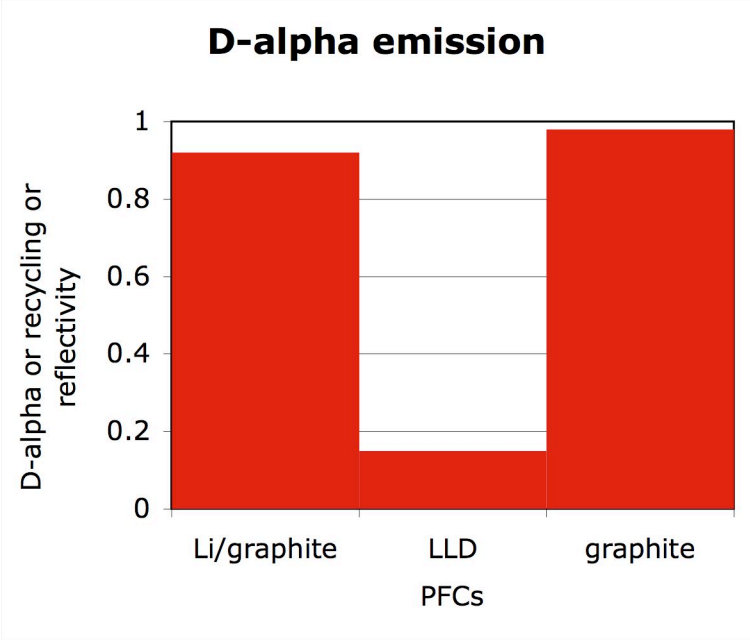
Treat wall and LLD separately:

Suppose gas input = 2 torr-liters / s

- Gross pumping = 100 liters/s
- Gross pumping to wall = 70 l/s
- Wall recycling = 96%
- Net wall pumping after recycling = 2.8 l/s
- Gross LLD pumping = 30 liters / s
- LLD reflectivity = 15%
- Net LLD pumping= 25.5 liters / s
- Pressure/density = 2/(2.8 + 25.5) = 0.071

Pressure/density reduced to 14% !

Or need to increase fueling x 7 to maintain previous density.



Should see huge drop of D-alpha over LLD !