Lintott Processor Upgrade – Process flow

Clean Room Operation

1. **Set the dose** (ions/cm^2/scan) x **scans** = total dose required.
    a. A dose of 1e15 is represented by a current of 2.5mA
    b. A dose of 1e14 by 250uA
    c. A dose of 1e13 by 25uA
    d. A dose of 1e12 by 2.5uA
    e. A dose of 1e11 by 0.25uA
    f. A dose of 1e10 by 0.025uA
    g. All other doses are directly proportional to the current range given.
    h. This is based on a motor tacho frequency of 1.33kHz
    i. The set dose/scans is dependant on the beam current available.
2. The chamber is in the vented state and the chamber door is open.
3. **Load** the first wafer plate on the carousel.
4. **Move** to the next wafer position and load the next wafer plate, repeat till 8 plates are in position.
5. **Close** the chamber door, the chamber door interlock is set.
6. **Notify** the control operator that loading is finished.
7. When the implant is finished and the chamber has been vented, then the chamber door is opened and the wafers are removed as they were loaded, and the process starts again.

Control Room Operations

1. **Start roughing** the chamber by **pressing start** on the vacuum control console. Roughing continues to 1.5e-4 at which point the roughing valve will close and after a delay, the beamline gate valve opens, after a delay of 10s, the HI-vac valve will open.
2. The beam is now ready to be optimised for implant by **selecting beam mode**. In this mode the vanes are fully open. Providing there is

sufficient beam current for the dose selected, the beam ready light will come on. This beam reading is derived from the beam shutter before the gate valve and after the vane unit. The beam current will be displayed as an absolute value as well as a normalised value (0-2), where 1 represents the exact current required for the selected dose. If one proceeded to implant with this amount of beam, the vanes would remain fully open. 1.5 times the required current is the optimum amount of current for the most effective vane control of the beam.

3. We now **select control mode**, where the motor will start and reach maximum operating speed, rotating the carousel but with no vertical movement. At this point the beam shutter opens and beam measurement is transferred to the carousel. Also the vane unit will close down until the required beam current is achieved and then begin controlling the beam current to achieve a 0% error between the motor speed reference voltage(5V) and the beam current reference voltage(-5V). Providing the beam current is still sufficient and the vanes are not fully open, the control ready light will come on and the wafers are now ready for implant.
4. **Implant mode** is now selected and the carousel lift brake is removed and simultaneously the lift clutch is engaged beginning vertical movement of the first scan. One scan comprises an up and down movement of the carousel.
5. After the required no of **scans has completed**, the carousel motor will stop turning, the brake will be engaged and the clutch disengaged, and remain in the parked or start position awaiting the wafers to be unloaded.
6. At the end of the run the **chamber is vented** by the control room staff. This is achieved by pressing the stop button on the vacuum control console. First the Hi-vac valve closes, after a delay , the gate valve will close and after a further delay the vent valve will open and the chamber will be brought to atmosphere.

Notes:

The vacuum control sequence, although automatic can be done manually and is useful for trouble-shooting.