

# Gunn Diode Oscillator Minutes

David Headland

2004-03-04 10:00

## Attendance

- Fourth year students:
  - AJ Nelms.
  - JM Higginbotham.
  - R Wan.
  - DP Headland.
  - MP Gaskill.
- UMIST Staff
  - WS Truscott (10:00–10:15, 12:00–12:13).

## Apologies

- RE Irwin.

## Approvals

- The minutes from the previous meeting were approved.

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## Power Supply

- This afternoon the 6 V 10 A power supply will be tested.
- A case needs to be made in the D floor workshop.
- The workshop may have holey or slotted metal to allow venting.
- Software is working for one output.
- Multi-output operation is being worked on.
- Bias circuitry is not suitable for 6 V operation.
- Bias circuitry should work without current limiting.
- Desired features for the software were discussed:
  - Individual diode biasing.
  - Individual diode switching on/off.
  - Ramping voltages up over time.
  - Current monitoring.
- Electrolytic capacitors may fail over time.
- Re-anodising has been suggested.
- This will be performed this afternoon.
- The workshop will PAT test the PSU on request.
- It was suggested that an IEC cable is added to the case for the PSU.

## Simulation

- WS Truscott has helped with suggestions.
- The filter circuit is on hold.
- The resonant disc is causing problems, work continues.
- P Norton has made a radial line transformer for our oscillator.
- We can compare our simulated design with P Norton's.

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## Building

- The new device needs testing as soon as it arrives.
- Spacing between the diodes was discussed.
- The spacing will be a function of  $\lambda$ .
- MP Gaskill will phone to check progress.
- Drawings for the multiple device oscillator will be sent as soon as possible after testing the single device oscillator.

## Final report

- The task split for the final report has been organised as follows:
  - Executive summary
    - \* Aims, motivation, progress compared to the plan: *Ruth*.
  - Introduction
    - \* Summary of interim report including block diagrams: *Ruth*.
    - \* Minor changes to the project since R1: *All, Ruth* to compile.
  - Body chapters
    - \* Management
      - Safety: Statement of changes: *Mick*.
      - Auditing: Finances: *Mick*.
      - Web site: *Dave*.
    - \* Overview
      - Research/Gunn history: *Dave*.
    - \* Single device oscillator
      - Design: *Mick*.
      - Simulation: *Jamie, Ruth*.
      - Testing: *Andrew, Dave*.
      - Optimisation: *Mick*.
    - \* Multiple device oscillator
      - Design: *Mick*.

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- Simulation: *Jamie, Ruth.*
  - Power supply: *Ray, Andrew.*
  - PCB: *Dave* (if required).
  - Testing: *Andrew, Dave.*
  - Optimisation: *Mick.*
  - \* Conclusions
    - Testing summary: *Andrew, Dave.*
    - Progress to date WRT time plan: *Ruth.*
    - Future objectives for this design: *Ruth.*
  - \* Other designs/future work
    - Hot electron injection: *Dave.*
    - Other information: *Ruth.*
- Key points for each chapter:
    - Summary of work/findings from R1.
    - Module Definition.
    - Progress.
  - Appendixes (attached as a CD):
    - Project plan: *Dave.*
    - Minutes of meeting: *Dave.*
    - Financial accounts: *Mick.*
    - Design Documents: *Mick.*

## Individual marks

- Suggested marks will shift percentages by  $\pm 2-3\%$ .
- The marks shifting applies to the interim report and presentation.
- WS Truscott will provide us all with a copy of the mailed document to sign and return to T York.

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## Out of hours working

- Passes not required for normal hours working over Easter.
- K Williams will want to supervise all measurements.
- No passes required for supervised work.
- May be useful to get second opinions, too.
- Need to collect enough data to draw conclusions and suggest possible improvements.
- WS Truscott suggested thinking about the required props for the demonstration.
- Order required items soon to guarantee availability.

## Proposed actions

DPH, AJN	Test the new and old oscillators with the attenuator as soon as they are available.
MP Gaskill	Check oscillator arrival and inform DP Headland and AJ Nelms.
R Wan	Send mobile phone software to MP Gaskill.
DPH, AJN	Test PSU and bias circuit.
JM Higginbotham	Continue work on the simulation.
AJN, DPH	Check and re-anodise PSU electrolytic capacitors.
R Wan	Make changes to the bias circuit software.
MP Gaskill	Ask e2v for the size of the pins for simulation.

## Next meeting

Time      Thursday 11 March 2004, 10:00.

Place      D2c coffee room.

Meeting adjourned, 12:13.