

Gunn Diode Oscillator Minutes

David Headland

2003-10-07 09:00

Attendance

- Fourth year students
 - MP Gaskill
 - DP Headland
 - JM Higginbotham
 - RE Irwin
 - AJ Nelms
 - R Wan

Swipe cards

It was agreed that after the meeting we should try to find Ian Hawkings to grant us access to the lab with our swipe cards.

New information gathered

General information

- Several useful papers had been found, and will be mailed to DP Headland for inclusion on the links section of the web site.
- A paper from MDT has been found with uses of Gunn oscillators and resonant circuits.

Device operation

- It was noted that few papers go into detail about the thermal properties and considerations of Gunn diodes.
- Injection locking was found as a theme and should be investigated further as a synchronisation method.
- It seems that in-depth knowledge of the Gunn device is not required. Each person can specialise in a certain area, making sure that the most important information is understood by all.

Circuit types

- Coaxial cavities, waveguides and planar circuits all need to be considered, and the final choice should be qualified in the documentation. We cannot just assume that planar circuits are the best and discount everything else.
- Coaxial cavities only seem suitable for frequencies less than approximately 15 GHz.

Oscillation circuits

- General oscillators have been researched in detail, which has proven to give a good understanding of microwave circuits.
- We will be using the W and F bands, mainly the W band.
- RF power depends on the device's cross-sectional area.
- Frequency is dependant on device length.

GaN Gunn diodes

- GaN provides high RF power levels at high frequencies, but require very efficient cooling methods.
- GaN devices are currently only being made in research quantities.

Combining diodes

- Certain experiments have shown that an arrangement of three diodes provides the greatest efficiency.

Safety audit

- MP Gaskill has experience in creating risk assessments.
- It would be difficult to create one assessment for the whole project.
- It is easier to take each activity and draw up a risk assessment.
- An example form for risk assessment was produced.
- A blank form will be placed on the web site for people to download, print and complete before an activity is started.
- Safety is a major priority.

Mailing lists

- The third mailing list, gunn-umist@winterwolf.co.uk, has been announced.
- All three mailing lists were summarised.

Financial control

- Several possibilities were considered:
 - Mailing MP Gaskill on making any purchase.
 - Starting a book to record all transactions.
 - Relying on statements from stores.
- It was agreed that a book should be started to record all transactions.
- The book will be checked by the auditor against statements and discrepancies can be investigated.

Web site

- Description: until further information is available, this should be based on the objectives sheet and aims memo.
- Biographies: all members were asked to start work on a biography based on the HOTFET site from last year.
- Links: all links will be updated as new ones are provided. Live links will be archived.
- Additional sections: none at present, but should be added as needed.
- An interest in the design of the web site was expressed. It was suggested that DP Headland gives a demonstration after the meeting.

Filing system

- Hard copies of all minutes, agendas, research information and any other document used in the project should be taken.
- Two files should be started:
 1. A research file for all information found during research. This should be indexed by subject.
 2. A file for recording everything else, such as minutes, reports, safety information, costings and presentation resources.
- If particularly useful information is discovered, a short summary should be produced for the benefit of the rest of the group. This could be used as a working document.
- The issue of typesetting vs. word processing was discussed, but the difference was not apparent to many members.
- A comparison will be shown at the next meeting.

November presentation

- Does not have to involve everyone physically presenting.
- Powerpoint was suggested as a display method.
- It should show our current understanding of Gunn diodes, oscillators, etc. and present the pros and cons of methods considered. It should also be considered as an opportunity to ask and relevant questions.
- Practise is essential.

Cruise control application

- Mercedes adaptive cruise control.
- Information may be available from TRW automotive (“TRW Conekt”).

Objectives

R Wan	Mail PDF copies of the useful documents to DP headland for inclusion in the links section of the web site.
MP Gaskill	Mail the MDT paper to DP headland for inclusion in the links section of the web site.
AJ Nelms	Research injection locking.
All	Read Nigel Priestley’s paper.
DP Headland	Provide a comparison between a word processed and a typeset document.
All	Start creating a biography for the web site.
All	Submit useful links for the web site as and when they are discovered.
DP Headland	Bring in lever arch files and dividers for the filing system.
MP Gaskill	Create a blank risk assessment form and mail to DP Headland for inclusion on the web site.
DP Headland	Update the front page of the web site as discussed.

Next meeting

Time Thursday, 9 October, 14:00

Place D-floor coffee room

Meeting adjourned, 10:33.

- Ian Hawkings could not be found, so swipe card access was not arranged.
- A demonstration of the web site was given in A19.