

Thursday 26th May 2005

RADECS Thematic Workshop on European SEE Accelerators Round Table 2: LET Calculation / Ion Penetration

Chairs : Françoise Bezerra/CNES & Sophie Duzellier/ONERA

Introduction points (by Françoise) : See presentation

- **Main problems identified, LET calculations not the same for all accelerators.**
- **LET value at sensitive volume is not the same as at the surface (source of error).**
- **Back side irradiation may be another source of LET calculation error**
- **Several tools exist: SRIM, TRIM, Kantele, Hubert & Al., ...**
- **The models give different LET values and range for higher energies?**
- **Is it possible to harmonise the LET value and range calculation?**
- **LET calculation at sensitive volume: Surface LET different from sensitive volume LET. Back side irradiation gives problems such as planarity.**
- **All technology parameters for a component not available, thus it is difficult to know where the sensitive volume is located.**
- **After thinning: The thickness of the Si is not uniform over the die. May lead to different SEE test results (e.g. LET enhancement).**
- **Reproducibility of test results (between two campaigns in the same facility and two campaigns in two different facility). Dosimetry problem? LET calculation problem? Homogeneity? Beam purity? Confidence in beam characteristics is important.**

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Round Table Points:

- The LET calculations for the highest energy particles give different values. This is also the case for the range calculations.
- Is there a person in the audience that can claim to give accurate calculation?
- It is suggested to employ a chip with varying thickness to directly measure the ion range in the device (based on SEU locations).
- BNL performed measurement of stopping power, how was this performed?
- Which calculation method is best, may be resolved by looking at a large compilation of data.
- Even in the SRIM data base there is inconsistencies. It would be interesting to measure the MeV / nucleon.
- SRIM is often used, it is known that there is a 10% inaccuracy.
- Identify someone that can measure accurate values and then improve the simulation tools.
- It is recommended that some one take on the task to create a working group to discuss and resolve this issue. **Wojtek**, suggested that such a working group may be established. Possible reporting place - RADECS September 2005.
- Problem of LET calculation at sensitive volume. A solution could be to employ long range ions so that one have a uniform LET through the device.

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- The needs of projects is usually given in LET threshold value. We have seen today that it is impossible that the beams have high LET and high range. What can be done?
- One suggestion was to modify the specification? Or discuss the specification in terms of decreasing the higher LET value requirement to practical values.
- In the CRÈME methodology if the width of the volume is specified as being much larger than the depth, the CRÈME may give pessimistic results.
- Some technologies have many layers, is there a need to correct the LET? How to do it?
- If the surface is taken into account in the assessment, optimistic results may be found.
- It is suggested to look at the available data to identify whether the LET value at the sensitive volume is a problem.