REVIEW OF SESSION 1.3 - SWITCHING TECHNOLOGY

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1. The Diversified Technologies paper (Michael Kempkes)

The paper describes an IGBT series array used as a solid-state Opening switch for Crowbar application replacement. This is a fast opening, and easily controllable array configuration, and is a good hardware demonstration of the IGBTs opening features.

2. The Marconi Technologies paper (Ron Sheldrake)

This paper gave no surprises except that it did show that thyratron development is still possible for creating low-cost, high-voltage, reliable switching devices. No mention was made of thyratron development for long pulse (100 μs) and high average current applications such as those for the CLIC drive beam klystron-modulators.

3 & 4. The APP Inc (C. Glidden) and ABB Semiconductors (Adriaan Welleman) papers

Thyratron and Ignitron replacement.

These companies proposed alternative solutions to using the thyratron based on interdigitated semiconductor technologies. They showed that rate of current rise of around 30kA/μs and peak currents of up to 100kA at 400 Hz repetition frequency, for pulse widths of several μs is possible. Wafer sizes that are used in this application range from 65 to 90 mm diameter, although for the same di/dt but at peak currents of about 6 kA and 3 μs pulse widths, wafer sizes of around 15 mm diameter are used as well. Operational voltages used are in general about 75% of the installed voltage of the device. Switches of this type are of modular design. Lifetime expectations are good although reliability data and field experience are still short. Availability of these devices and their costs will come down as volume production improves. Questions that are uppermost in the designers mind are: Does one make the switch circuit development in-house, or provide a good specification based on realistic simulations and fault analysis situations for development of an appropriate device for the circuit at the semiconductor manufacturers? What are the long-term maintenance implications?