

On the History of Vacuum Electronics: The Tube Museum of RWTH Aachen University

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The “Museum of Tubes and Communication Techniques” of the Institutes of High Frequency Technology (IHF) and of Communications Engineering (IENT) of RWTH Aachen University in Melatener Str. 23+25 was founded by Professor Aschoff (communication) [1] and Professor Döring (tubes) in 1952. Prof. Döring is well known to some of the audience from the ITG/NTG Fachtagungen in Garmisch-Partenkirchen and his presentations on Gyrotrons and other tubes [2]. With over 1000 exposition items the museum reflects the dramatic development of these technologies from their historical beginning to their modern status [3,4]. Early communication in the 18th century was essentially based on optical techniques, which were followed by various developments of wired telegraphy systems [1,3]. Vacuum tube technology then offered a „new“ solution, starting 1904 with the diode rectifier by John A. Fleming (UK) and Arthur Wehnelt (Germany) and continuing in 1906 with the triode by Lee de Forest (USA) and von Lieben (Austria). In 1916 followed the tetrode by Walter Schottky and in 1926 the pentode by Bernard Tellegen (Philips, NL). Numerous radio tube types are shown in the exhibition. Also low power reflex klystrons, a Philips 600 kW multicavity klystron of 500 Mhz and about 3 m length, other microwave tubes and X-ray tubes are shown, and last but not least several types of CRT tubes. The rise and fall of radio tubes and cathode ray tubes and the historical trends and technological waves in vacuum electronics and neighboring fields will also be discussed [5]. In contrast to the generic technology cycles of radio-receiving tubes and cathode-ray display tubes, microwave tubes did experience only a partial replacement by solid-state devices and defend the high-power, high-frequency domain.

Unfortunately the exhibition is currently disassembled due to renovation of the building. We all hope, that the exhibitions will be set up again after renovation, because this tube museum is a unique collection and witness of the historical development of vacuum electronics. After Prof. Döring the tube collection of the IHF was continued by Prof. H. J. Schmitt and later by Prof. B. Rembold. Currently the director of the IHF is Prof. D. Heberling, whereas Dipl. Ing. J. Pamp is in charge of the tube collections [6]. The director of the IENT is Prof. A. Raake and responsible for the part of communication techniques is Dr.-Ing. C. Rohlfing [6]. We should thank them for maintaining this unique museum in Aachen.

The tube museum should not experience the detrimental fate of the Computer Museum of RWTH Aachen, which was closed and abandoned in 2009, with some acquisitions by other museums. The city of Aachen certainly honors the heritage of Charles the Great, but it seems it does not really honour its technical history with the same intensity.

References

- [1] V. Aschoff, “Geschichte der Nachrichtentechnik” Bd. 1+2, Springer 1995
- [2] H. Döring, „100 Jahre Elektronenröhren“, NTG Fachbericht Nr. 85, VDE Verlag 1983, p. 7 – 11 und ntz, Bd. 36 (1983), p. 644 – 652
- [3] H. J. Schmitt, RWTH-Aachen, “The Rise and Fall of the Vacuum-Tube”, Aachen 2004
- [4] Karl H. Müller, “Dokumentation über das Röhrenmuseum im Institut für Hochfrequenztechnik der RWTH Aachen”, Aachen 2008
- [5] G. Gaertner, “Historical development and future trends of vacuum electronics”, J. Vac. Sci. Technol. **B 30(6)**, Nov/Dec 2012, 060801-1 -14; PR-R31.717
- [6] See also: <https://www.ihf.rwth-aachen.de/en/institute/tube-collection> and <https://sammlung.ient.rwth-aachen.de/virtueller-rundgang/foyer.html>