Calorimetry - Energy Measurement in Particle Physics; Richard Wigmans (Clarendon Press, Oxford, 2000), 726 pages.

The role of calorimetry in high energy physics has become increasingly important during the last 20 years. This is due to the increase in energy of the particle beams available at the major accelerators and to the need for hermetic detectors. The 1980's, in particular the second half of the decade, saw an important breakthrough in the understanding of the mechanisms underlying the development of hadronic cascades and their energy loss. The theme around which this breakthrough took place is 'compensation': for a compensating calorimeter $e/h = 1$, where e represents the response to an electromagnetic and h the response to a non-electromagnetic, i.e. purely hadronic, shower of the same energy. For compensating calorimeters the energy measurement of electrons and hadrons of the same energy yields the same average response for all energies, at the same time leading to optimal hadronic energy resolution. It is also a prerequisite for linearity of the hadronic energy measurement.

In practice very few compensating calorimeters have been built for major experiments (one example is the calorimeter of the ZEUS experiment at HERA, discussed in the book), probably because in practice achieving compensation means making a concession to the electromagnetic energy resolution. None of the experiments planned at the Large Hadron Collider, for example, will employ a compensating calorimeter. The importance of the research into compensation is nevertheless very large in that it led to a much better understanding of calorimetry in general. The author of the book has made original and essential contributions to this field through his own research.

The book reflects the deep and also the encyclopedic knowledge the author has of the subject. This makes the book a rich source of information that will be useful for those designing calorimeters and for those analyzing calorimeter data, for a long time to come. At the same time the book is not always successful in finding a way of organizing and conveying all this knowledge in a clearly structured and efficient way. Parts of the book are rather narrative and long-winded.

The most important chapters are those on Shower Development (Ch. 2), Energy Response (Ch. 3), Fluctuations (Ch. 4) and Calibration (Ch. 6). Also Ch. 5, Instrumental Aspects, contains essential information. The chapters on generic studies and on existing (or meanwhile dismantled) and

planned calorimeter systems are interesting but less necessary parts of a text book. Moreover the author does not always keep to the subject, calorimetry, leading to unnecessary excursions and, which is worse, coverage of outdated material. It would, on the other hand be interesting if the author, in his description of the calorimeters under construction for the Atlas experiment, would have been a bit more explicit on what, in the light of the ideas developed earlier in the book, the optimal approach would be to (inter)calibrating this very complex calorimeter system.

The chapter on Calibration (Ch. 6) is probably the most essential part of the book, bringing together many of the fundamental issues on shower development, signal generation and detection. Reading this chapter one gets the impression that in fact it is impossible to calibrate calorimeters, but the style chosen by the author is only to emphasize that the issue is subtle and great care must be taken. The chapter contains information extremely worthy of consideration, culminating in the recommendation that, in the case of non-compensating calorimeters, individual (longitudinal) calorimeter sections should be calibrated by the same particles generating fully contained showers in each section, a recommendation that, in practice, can not always be satisfied of course. In his ardor to emphasize the importance of (inter)calibration of longitudinal calorimeter segments the author even invokes decays, such as that of the ρ^0 into two π^0's, that do not exist in nature - we get the point and forgive him. It is, however, true that there are more places where the book would have profited from a critical, final editing.

'Calorimetry' is a book that describes the essential physics of calorimetry. It also contains a wealth of information and practical advice. It is written by a leading expert in the field. The fact that the discussions sometimes do not follow the shortest path to the conclusion and that perhaps the 'text book part' of this work should have been accommodated in a separate volume does not make the book less important: it will be amply used by those trying to familiarize themselves with calorimetry and in particular by those analyzing the data of the very complex calorimeter systems of future experiments, e.g. at LHC.

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