

THE INDUSTRIAL AND ENVIRONMENTAL APPLICATIONS OF ELECTRON BEAMS

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PREFACE

Currently there are more than 30 000 particle accelerators in use around world, in applications ranging from treating cancer to developing better computers. In recognition of this, the European Union Framework Programme 7 supported project EuCARD-2 has created a Network on Accelerator Applications. The objectives of this are to bring together accelerator developers, manufacturers and users to look at existing and possible new applications, identify limitations and study whether technology from the research arena could bring improvements. This work is being carried out through a series of workshops focused on particular applications. The aim in each case is to create new collaborations to tackle issues identified during the workshop and potentially seek further funding to do this from the European Union Horizon 2020 programme.

One of the most important technologies in the applications area is electron beams up to about 10 MeV beam energy. These are used for many applications, including the sterilization of medical products, improving the properties of polymers and other materials and even treating food. In addition, there are a number of newer applications, particularly in the environmental area, including the treatment of contaminants in water, the removal of acid rain creating pollutants in the flue gases of power stations and the possibility of breaking down large organic molecules in agricultural waste to make it useable as bio-fuel. These applications typically require high beam current, very reliable, inexpensive and easy to use accelerators, and meeting these requirements remains a challenge, especially at the higher energies.

Due to the importance of the field, a workshop entitled “The industrial and environmental applications of electron beams” was organized by the Institute of Nuclear Chemistry and Technology in Warsaw on 6th and 7th November 2014. This was jointly sponsored by EuCARD-2 and the Polish Ministry of Science and Higher Education. This workshop has led to the production of this book, to describe the technology used for the acceleration of electron beams, the current applications and the future directions.

Rob Edgecock