For total skin electron beam irradiation, the patient is usually arranged at an extended SSD (3 to 4 meters). The electron field at such extended distance will not provide adequate dose uniformity over a patient. The conventional treatment technique used to overcome this problem is to apply a dual or multiple field configuration. The dual or multiple field configuration presents complexity in dosimetry measurement and calculation. A flat electron beam intensity profile produced by a single direct beam would simplify the dosimetry and the treatment setup. Although the flattening of electron beam profile at an extended SSD can be achieved by using an absorbing material similar to a photon flattening filter, the difference in energy degradation due to the thickness gradient of the filter will cause the difference in beam penetration across the patient's skin. This is clinically undesirable. Applying the principle of iso-energetic electron beam intensity modulation*, an electron flattening filter was designed to produce a flattened profile at the extended SSD without degrading the beam energy.

The design and dosimetry study of this electron beam flattening filter will be presented. The results have shown significant improvement of dose uniformity using single direct filed, which simplified the dosimetry as well as the treatment set-up for total skin electron beam radiotherapy.

* The Principle and Applications of An Iso-energetic Intensity Modulation Method for Therapeutic Electron Beams, X. Wu, J.Y. Ting, C.C. Yang, M.L. Watzich, A.H. Wolfson, A.M. Markoe., I.J. Rad. Onc. Bio. Phys. Vol 39-2, Supp. P.150, 1997.