Particle Dynamics Design Aspects for an IFMIF D^+ RFQ, D. LI[*] , R.A. JAMESON[**], H. DEITINGHOFF, H. KLEIN, IAP - A conceptual design activity for an International Fusion Material Irradiation Facility (IFMIF) has been started to investigate the feasibility of an intense D-Li neutron source. As injector of the acceleration system, a RFQ is required to accept, bunch and accelerate a 125 mA D^+-beam to 8 MeV with a very good beam quality for low losses in the following main accelerator part. To fulfil these severe requirements, extensive numerical calculations of the particle dynamics in the RFQ have been performed, with special emphasis on the equipartitioning design strategy, in which the temperatures in all directions are well balanced to prevent possible coupling resonances caused by the strong non-linear space charge forces. Design aspects and the resulting beam behaviours are presented. Moreover, the influences of higher-order multipoles, and the possible mismatching or filamentation of the input beam on the beam quality will be discussed.

* On leave from Institute of Heavy Ion Physics, Peking University, Beijing 100871, China.

** Los Alamos National Laboratory, Los Alamos, NM 87545, USA.